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A COMETARY RETROSPECT.

From recent calculations of the elements of Coggia's comet by Mr. Plummer, an English astronomer, there appears to be a close similarity between them and those of Comet II of 1737.

There will doubtless be many who, in gazing at the comet night after night as it gradually augments in brilliancy, will ponder as we have over the vast progress which the world has made since the era of the former visitation.

Looking at the condition of Science in 1737, from our present standpoint, it is easier to regard the circumstances negatively, to imagine our own condition if deprived of the results of discovery and of progress which have accumulated in the intervening years.

districts, and the boy, who sat beside it and worked the condenser valves, had not been struck with the brilliant idea of making catches and strings perform the labor in his stead. The Marquis of Worcester and James Watt were unknown to fame.

Whale oil was burned in the lamps, which formed the sole means of illumination when candles were absent. Petroleum, paraffin, and illuminating gas were yet to be found.

Laplace had not given his labors to the world. Saturn's rings and satellites had not been discovered, and the path of that planet was supposed to be the outer bound of our solar system.

India rubber had been discovered one year. There was no definite system of botany, and Cuvier's researches in natural history had not appeared.

Our retrospect already extends beyond intended limits, and we have far from even summarized the great discoveries of the past century and a half.

TAXING POWER OF THE LEGISLATURE.

Law, in its true sense, is the product of the highest reason coupled with the most exact justice. The Civil or Roman Law and the Common Law of England are to be admired as models.

The most notable instance of this may be found in such legislative acts as provide for the disbursement of large sums of money in making public improvements, and then charging the whole cost as a tax on specific individual property without the consent of the owners.

This doctrine is so arbitrary in form and so destructive of individual rights that it becomes a relief to know that our sister State of New Jersey, through Chief Justice Beasley, of its Court of Errors and Appeals, lays down a much milder and wiser rule for that State, in a recent decision made

by him at the suit of "The Mayor and Common Council of Newark vs. The State, Agents et al.

The facts were that a certain street in Newark had been repaired under an act of the legislature which provided that two thirds of the cost should be imposed on the owners of lots fronting on the line of the improvement.

" \* \* \* That the effect of such laws may not extend beyond certain prescribed limits is perfectly indisputable. It is upon this principle that taxes, raised in counties, towns, and cities, are vindicated.

If such prerogative has no trammel or circumscription, then it follows that the entire burthen of one of these public improvements can be placed by the force of the legislative will on the property of a few enumerated citizens, or even on that of a single citizen.

So far as the particularized property is specially benefited, an exaction to that extent will not be a condemnation of property to the public use, because an equivalent is returned.

Speaking on this subject, Chief Justice Green says: 'The theory upon which such assessments are sustained, as a legitimate exercise of the taxing power, is that the party assessed is locally and peculiarly benefited, over and above the ordinary benefit which, as one of the community, he receives in all public improvements.

A full review of this able decision and the cases it cites would interest and instruct all lovers of sound law. It imparts the good old doctrine that States and Legislatures are only the product of an aggregate of individuals, created alike for the general and individual good.

RECENT PRINTING PRESS IMPROVEMENTS.

In the working of nearly all printing presses the sheets of paper are supplied by hand, the workman being known as a "feeder." Each sheet must be taken up singly and exactly placed on the feed board, where it can be seized by the press nippers at the proper moment.

five years past, to substitute mechanism for this species of hand labor, but without much success until the present time. We have recently had the pleasure of witnessing, at the extensive press rooms of the *Independent* newspaper, Rose street, in this city, the practical operation of a mechanical feeder which is, apparently, the perfection of success. It takes up the sheets separately upon a steel point, carries them forward and delivers them to the nippers, between the adjustable guides, with almost infallible accuracy. Every contingency seems to be provided for. If by any possibility the device fails to place the sheet properly, or fails to feed, the press instantly stops. If two sheets in the pile are by any means tucked or folded together, or if two sheets are lifted, the press stops. All inaccuracy of feeding, or the running through of doubles or "packets," is prevented, and much spoiled work obviated. The first move or slide of the upper sheet of the pile is given by a rubber-faced presser, no air suction being used. The apparatus is suited to nearly all presses, and is quickly adjustable to sheets of various sizes.

When we consider that there are some thirty thousand power printing presses now worked in the United States, to which this improvement is applicable, its importance becomes in some degree apparent. It is believed that the invention will save its cost in less than a year by its diminution of spoiled sheets, to say nothing of its saving in the wages of feeders. It is applicable to steam, lithographic, and other presses used in color printing, and it will greatly reduce the cost of producing fine chromo pictures, some of which are required to be fed through the press from twelve to twenty times, a separate impression being necessary for each shade or print of color. Mr. C. E. Baker, the superintendent of the *Independent* press rooms, 21 Rose street, New York city, will furnish additional information concerning this invention.

**PATENTED CAR IMPROVEMENTS.**

Two or three years ago the Master Car Builders' Association adopted, as a plank in their constitution, the brilliant idea of excluding from discussion all mention of patented devices concerning railways. If any man patented a car that could be built equally as strong as the present cars for half the money, or if he should invent and patent a truck that would not leave the track, and thereby greatly improve the safety of cars, preventing loss of life and property, he was forbidden to explain its merits before the Association, and that enlightened body could not, officially, take any cognizance of the new discovery.

There is no mistake about it that the discussions of the Master Car Builders, composed, as they are of practical, wide-awake men, are of great importance in imparting and circulating sound, valuable information about the needs and merits of railway vehicles. We doubt whether there is a more able body of practical workers associated together in any of the various branches of American industry than these same car builders; and how they could ever have permitted such a streak of narrow-mindedness as this anti-patent declaration to creep into their constitution is to us quite unaccountable. At the late session of the Association, one of the members, in discussing the merits of various car roofs, was taken to task because he had spoken well of somebody's patented roof. But it was alleged in reply that, if the Association had done wrong heretofore in such matters, it was time that correction should now be made, for it was demonstrated that, in order to make progress, the Association must, of necessity, investigate patented improvements, and adopt those that are best. This is a sensible conclusion, and one that almost any old lady would have come to without waiting three years, or stirring up bile in the family.

**THE MINES AND MINERALS OF INDIA.**

For ages unnumbered, India has been famous for wealth in precious stones. Our geographies still speak of it as a land of gold and diamonds; and the popular idea is that its mineral resources are immense and inexhaustible.

So much for current fame. The facts of the case, as developed by the labors of the government geologists, show a very different state of things. The greater part of the vast area of the Indian Peninsula is either destitute of valuable minerals, or they occur in a manner which throws serious obstacles in the way of their utilization; while in the richer districts, the real mineral wealth lies not at all in the mines for which the country has been celebrated. The only diamond mines that pay or promise to pay for working are of the "dusty" variety, more useful for fuel than for ornament; and its precious ores are chiefly those of iron, as yet but little developed.

Copper occurs in many parts, and is mined in several places among the Himalayas, especially in Kamaon, Gurhwal, Nepal, and Sikkim. The mines are worked by natives, and the product is so inconsiderable that, even where the mines are most abundant—in Kamaon,—it is insufficient to supply the local demand. In the alluvial plains of Northern India, the copper-bearing points are few and the yield insignificant. In the metamorphic areas of the eastern and southern parts of the peninsula, where metallic ores occur but sparingly, the principal points, at which copper mines have been worked by the natives at various periods, are in Rajputana, the countries southwest of Bengal, and in the Presidency of Madras. At present the only works regularly carried on are near Jaipur, in Rajputana. Ancient workings abound near Chaibassa, in Bengal, where an extraordinary series of deposits occur, partly in lodes, partly disseminated through schists, and extending for a distance of eighty miles. Much fine ore still remains here, chiefly carbonate and red

oxide of copper, with copper glance occasionally; but attempts to re-establish the workings by European miners have never proved successful.

Lead is less abundant than copper, with which it is commonly associated. Rich veins of galena are said to occur in Kulu, in the Northwestern Himalayas, and more sparingly in Gurhwal and Sirmur, but little has been done toward developing them.

Tin has been reported from two to three localities in the plains of India proper, but nothing is accurately known of its occurrence. Rich tin deposits are believed to exist among the mountains between British India and Siam, the same range which affords the well known stream deposits of Malacca, farther south: but the inaccessible character of the country has hitherto prevented any attempts to work them.

Silver is said to occur with the galena in Kulu, and with certain copper ores in Deogurh, but the quantity is small. The Deputy Superintendent of the Geographical Survey visited the latter place, but could find no evidence of a vein or other regular deposit of the ore. Gold is found in many parts, but always in very small quantities, in stream gravels. It is extracted by rude processes of washing, and the yield is so small that none but the poorest of the natives engage in the search, and these only in the spring, when agricultural work is suspended.

Small quantities of an ore of cobalt are found near Jaipur, in Rajputana, and are used for the coloring of enamels. Antimony occurs in Kulu and Lahaul, and zinc at Jawad in Mewar. Chromic iron ore is found near Salem, in the Madras Presidency.

Considering the immense area of India, its share of the more precious metals must be rated as extremely small. Nor is it probable that future discoveries will greatly increase its resources in this respect. For thousands of years the country has been thickly populated by natives familiar with at least the rude processes of mining and metallurgy; and as the remains of extinct and in many cases extensive workings abundantly testify, the country has been thoroughly explored. Besides, with the abundance of labor at the absolute control of the rulers, it has been possible to work mines, especially for gold and precious stones, which would not pay expenses with hired labor. Even the diamond workings, which helped to supply the ancient rulers with their stores of gems, were very likely carried on at a cost of labor which, if paid for, would greatly exceed the value of the proceeds.

The diamond-bearing districts are chiefly in the country around Karnul, Kuddapah, and Ellore, in the Madras Presidency, near Sambhulpar on the Mahanadi; at Weiragad southwest of Nagpur, and at Panna, in Bandelkhand. Of late years comparatively few diamonds are found, and the few attempts that have been made to reopen the mines have proved unprofitable.

Of rubies, sapphires, and other precious stones, India is quite destitute, though they are found in Ceylon, Independent Burma, and in the countries northwest of the Himalayas. The best that India can offer for jewelry are agates, cornelians, and other forms of quartz derived from the trap rocks of the central and western portions. Corundum occurs in Mysore and Salem, also in Rewah, where there is a bed several yards in thickness, associated with jade.

Infinitely more valuable than the gold and gems of the past are the salt beds of the present. The deposits of this homely yet necessary substance in the salt range of the Punjab furnish upwards of fifteen hundred millions of dollars a year to the revenue of the government. The deposits are practically inexhaustible, and for extent and purity have no known rival. The prevalent color is white, sometimes tinted pink or reddish, the mines forming crystalline grottos of indescribable beauty. Another kind of salt is found in great quantities in the Trans-Indus county of Afghanistan, occurring in masses in the beds of ravines; and though less white than that of the Punjab, is considered more savory.

More important than the salt mines are the extensive deposits of coal. So far as explored, the coal fields of India are chiefly comprised in a tract of country stretching from the neighborhood of Calcutta, and from a line roughly parallel with the coast of the Bay of Bengal and distant from it between one hundred and one hundred and fifty miles, to about the 78th parallel of east longitude. On the north it is bordered by the plain of the Ganges, and on the south it extends locally a little beyond the Godavari. Outside of this area, the only coal fields of promise are those of Upper Assam. The geological age of these coals, long in dispute, has now been clearly ascertained to be that of the Australian coal, differing little if at all from the carboniferous of Europe. A few deposits of lignite occur in the Punjab, but they are small in quantity and inferior in quality.

Geographically the coal fields of India are roughly divided into four groups: 1. Those of Bengal, including the coals of the Rajmahal Hills and those of the valley of the Damuda. 2. Those of Rewah, Sirguja, Bilaspur, Chutia, Nagpur, and the tributary meahs of Orissa. 3. Those of the Nerbudda valley and the hills to the south of it. 4. Those of Chanda and the Godavari.

The principal field is that of Raniganj, beginning about 120 miles northwest of Calcutta, and extending northward about eighteen miles, with an extreme breadth of fourteen miles. This field supplies about half a million tons a year, ten times the yield of all the other fields together. The seams which are mined vary in thickness from 4 to 35 feet, and are individually variable. Eighteen distinct coal-bearing areas are enumerated in the several groups, but the most of them are so little explored that no trustworthy estimate can be made of their contents. In all the basins the coals are mostly concentrated in one bed of great thickness, consisting

of alternations of coal and shale, and the beds thin out rapidly to the west. In the Raniganj field, where the formation attains its maximum thickness, the upper group is 5,000 feet thick, the lower 2,000, each containing several seams of coal. To the west the upper group is replaced by rocks containing no coal, while the lower diminishes greatly in thickness.

Scarcely anything is known of the Upper Assam fields save that there are several seams and the coal is of excellent quality, containing only two to five per cent of ash. Unfortunately these deposits are almost at the extreme east end of the Assam valley, in a country thinly inhabited and hard to be got at. Some of these coals are said to coke while burning; but with this exception, the Indian coals are all free burning and will not form coke. Generally, too, they are very lean, containing from ten to thirty per cent of ash. For mechanical purposes, they are little more than half as valuable as English coals, and are consequently unfit for use in sea going vessels, owing to the great bulk and the labor of handling. Unless they can be made available for smelting purposes, especially for iron, the demand for them will be restricted almost entirely to railway use, river steamers and stationary engines. It is hoped, however, that with proper selection and care they may be made available in the manufacture of iron; in which case the greatest possible impulse will be given to coal mining, and there is reason to believe the immediate future will bring to India an iron age of productive wealth compared with which the barbaric splendor of the past will be as nothing.

Unlike the ores of the rarer metals, those of iron are widely and generously distributed throughout India, some of the deposits being unsurpassed in quality and abundance. The more valuable of these deposits are of magnetic and specular ores and red hematite, in beds or veins among metamorphic sub crystalline rocks; for size and character, they remind one of the iron mountains of Missouri. There are, besides, clay iron ores in the coal-bearing strata and beds of brown hematite in other stratified rocks; also surface deposits of magnetic iron sand, and nodules of brown hematite, which supply the ores chiefly used by the native smelters.

The most remarkable deposits are near Salem, in the Madras Presidency. They consist of immense beds, from fifty to a hundred feet or more in thickness, the outcrop extending frequently for miles. One of these forms the ridge of a hill 1,500 feet high and four miles long. Another hill of equal length, not far distant, contains five bands of magnetic ore, from twenty to fifty feet thick, which can be traced all round the hill. These are but two instances out of many that might be cited from this locality. At Lohara, in the Central Provinces, a hill two miles long and half a mile wide appears to consist entirely of specular and magnetic ore which yields 70 per cent of metallic iron.

The deposits of hematite, though on a less imposing scale, are often of great extent and richness. The clay iron ores are similar to those of the English coal fields, and the quantity large. A great number of specimens from the Raniganj field yielded on assay an average of 39 per cent of iron. Thus far the few attempts to manufacture iron in India on a large scale have, for various causes, resulted in failure. There is no reason to doubt, however, that the difficulties will be overcome, and these vast beds of iron ore be made the sources of immense industrial activity and wealth.

**The Next Fair of the American Institute.**

We have received the usual pamphlet containing the announcement of the 43d fair of the American Institute. The exhibition will be held in the same building as last years' on Third avenue between 63d and 64th streets in this city, and opens, for the reception of machinery, August 17, 1874. Goods will be received from the 31st of the same month, and the formal opening to the public takes place on the 9th of September. Unless it be deemed expedient to continue the fair an additional week, the 14th of November is designated as the closing day.

Some changes have been made in the classification of entries, and the number of awards has been increased to nine. They now consist of gold medals of honor and progress, a medal for taste, a silver medal, a bronze medal, diploma, and special diplomas for continued superiority and excellence and for coöperation.

We would remind intending exhibitors of the necessity of early preparation. There is plenty of time afforded, to have everything in readiness before the fair opens, and so to avoid the confusion which usually occurs during the opening week.

**Cincinnati Industrial Exposition.**

The success of the expositions held annually in Cincinnati for the past four years has justified the managers in enlarging their space and extending the field of operations. The very elaborate circular now before us contains over 900 premiums to be awarded for excellence in all departments of manufactures, domestic industry, agriculture, science, and art. Although the space at the disposal of the management is very large, it is desirable that early application be made for allotments, as the wish to exhibit at these expositions becomes more and more extended. The buildings will be open for the reception of goods from August 3 to September 1 and the exposition will open to the public on September 2 and will remain open till October 3. Applications for information and documents must be addressed to W. P. Anderson, Secretary, Cincinnati, O.

POWDERED chalk, added to common glue, strengthens it. A glue which will resist the action of water is made by boiling one pound of glue in two quarts skimmed milk.