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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 is a sufficient correspondence, it seems, to warrant the belief that the two comets are identical, and that we are receiving a second visit from the vagrant body which attracted the notice of the astronomers of a hundred and thirty-seven years ago. We find no record of its being a very prominent object, although it appears to have been observed in many of the great cities of Europe. Nor do we find statements of any peculiar phenomena connected with its appearance.

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.

Locking 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 re sults of discovery and of progress which have accumulated in the intervening years. The spot, on which the building in which we now are stands, was then but a green meadow. The crowded metropolis was existing only in the germ, and that merely a few straggling streets close to the water's edge. George II. was on the throne of England, and Louis XV. on that of France. Both amiable sovereigns were struggling to monopolize as much of North America as possible; and although at the time peace reigned in the colonies, it was but a temporary one, which ended in still fiercer hostilities seven years later. Sir Isaac Newton had been dead for six years, and the mathematicians of England were arrayed against those of the continent, squabbling and bick ering, with an acrimony intensified by international jealousy, over the theory of gravitation. Newton had studied out the subject of electricity and had invented the glass globe machine. Stephen Gray had also made some investigations, but no one had ventured a theory, nor had an application of the new phenom na been suggested. Telegraphy, the galvanic battery, the innumerable inventions based thereon, were all things of the future. There were plenty of alchemists in Europe, and the science of chemistry was just wrenching itself free from connection with their chimerical fancies. Stahl had but recently announced his theory of philogiston, a substance which Cavendish in subsequent discoveries believed identical with hydrogen. But the transition period in chemical science was yet nearly forty years distant. Priestley, the discoverer of oxygen, was but an infant. Black, the investigator of the alkalies, and Scheele, the inventor of modern organic analysis, were likewise children. Out of the sixty-three elements, but fifteen were known. Aluminum, chlorine,oxygen, hydrogen, nitrogen, platinum, and nickel were among those which had never been recognized.

Newcomen's steam engine was used in the mining dis-

denser 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. The first railroads were in use in the coal districts of Northumberland and Durham, but the rails were nothing more than wooden beams, and iron was not to be substituted for them for thirty years. In the blast furnaces wooden bellows were in use. Puddling,rolling,and the hot blast were unknown. In Europe cast steel had never been made, and but a short time had elapsed since the publication of Réaumur's work, making known the process of manufacturing ordinary steel. In this country Jonah Higby's patent, obtained from the Connecticut legislature, for a "curious art to transmit common iron into good steel" had just run its term of ten years. Having no autonomy as a nation, we had no patent right system in those days, and even civilized France had mace to effort toward establishing one. The arts of photography or sun painting in any form were undreamed of. The sciences of aeronautics and of agricultural chemistry had never been imagined. Surgeons hacked off the limbs of their victims and seared the flesh with red hot irons, regardless of the agony they inflicted, for anæsthetics were unknown. The phenomens of digestion were but little understood, and quinine, with hundreds of other remedies now common, had not been discovered.

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. In artillery and implements of war, the bayonet had just superseded the pike, the flint lock musket was just coming into use, while a single monster cannon of the present day would have dispersed whole regiments armed with the prim itive artillery then employed.

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. The spectroscope had made none of its wonderful revelations, and the distances of the fixed stars, their apparent motions, and the fact of their being suns and centers of other systems, the 5,700 nebulæ, and the 136 asteroids, all

were unknown.

India rubber had been discovered one year. There was no definite system of botany, and Cuvier's researches in natural history had not appeared. The caloric engine, the hydraulic press and ram, the sewing machine, and the diving bell had never been thought of. Blowpipe analysis and the atomic theory, a system of logarithms, calico printing, the steam printing press, all were yet to be invented. No one had deciphered the inscriptions on the monuments of Egypt. Jenner had not introduced vaccination, nor Hahnemann homeeopathy as a school of medicine. Steam navigation and the screw propeller were yet to appear. Captain Cook was making his celebrated voyages around the world. Immense portions of Australia, of Africa, of the polar regions, had never been visited by civilized races. Anthracite coal had never been burned, nor the powerful explosives now known to Science used to tear rocks asunder. Dentistry was unknown as a profession on this side of the Atlantic, and artificial teeth had not been invented. The first chronometer had not been completed. The pianoforte was a new-fangled invention, which no one would have aught to do with until his Majesty Frederick the Great of Prussia deigned to buy one ten years later. Polarized light had not been discovered. No post office system had been developed by any government, nor had any improved means of teaching the deaf and dumb been adopted. Steel pens were unknown, and the SCIENTI-FIC AMERICAN was not one of the seven newspapers then existing in North America.

Our retrospect already extends beyond intended limits, and we have far from even summarized the great discoveries of the past century and a half. That our descendants will surpass us as much as we do our ancestors is within every bound of probability. When our celestial visitor again appears, as it will in the year 2011, it will reveal itself to the gaze of earthly inhabitants, regarding the magnitude of whose knowledge and whose powers it would be idle even to speculate.

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 The great deviations from genuine law are to be found in arbitrary acts of our State Legislatures, seriously affecting the rights, liberties, and property of individuals, and the tendency of the courts to give validity to such acts in contravention of constitutional guaranties and those of the common law.

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, and, as has sometimes happened, to the entire confiscation of the property. The power of the legislature to do this, and to act as the final judge on the propriety of any public improvement, from which the individual has no redress, although ruined thereby, is now, as we understand the law. laid down by the Court of Appeals of the State of New York.

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 mild-

tricts, and the boy, who sat beside it and worked the con- by him at the suit of "The Mayor and Common Council of Newark ads. The State, Agens 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, and one third on the city treasury; and the question was whether the legislature could fix, at its mere will, the ratio of expense to be put upon the owners of the property along the line of the improvement. The following is an extract from the very able opinion of the Chief Justice, fully concurred in by his associates, and well worthy the attention of the courts of this and other States:

"* * 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. But while it is thus clear that the burthens of a particular tax may be placed exclusively on any political district to whose benefit such tax is to enseems to me it is equally clear that, when such burthen is sought to be imposed on particular lands, not in themselves constituting a political subdivision of the State, we at once approach the line which is the boundary between acts of taxation and acts of confiscation. I think it impossible to assert, with the least show of reason, that the legislative right to select the subject of taxation is rot a limited right. For it would seem much more in accordance with correct theory to maintain that the power of selection of the property to be taxed cannot be contracted to narrow-er bounds than the political district within which it is to op-erate, than that such power is entirely illimitable.

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. In a government in which the legislative power is not omnipotent, and in which it is a fundamental axiom that private property cannot be taken without just compensation, the existence of an unlimited right in the law-making power to concentrate the burthen of a tax upon specified property does not exist. If a statute should direct a certain street in a city to be paved, and the expense of such paving to be assessed on the houses standing at the four corners of such street, this would not be an act of taxation, and it is presumed that no one would assert it to be such. If this cannot be maintained, then it follows that it is conceded that the legislative power in question is not completely arbitrary. It has its limits, and the only inquiry is where that limit is to be placed. * * *

So far as the particularized property is specially benefited, an exaction to that extent will not be a cond mnation of property to the public use, because an equivalent is returned, and this is the ground on which the abnormal burthen put

upon the land owner is justified.

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, to the precise extent of the assess ("State v. City of Newark, 3 Dutch. 190.) It follows, then, that these local assessments are justifiable on the ground alone that the locality is especially to be benefited by the outlay of the money to be raised. Unless this is the case, no reason can be assigned why the tax is not general. An assessment laid on property along a city street for an improvement made in another street in a distant part of the same city would be universally condemned, both on moral and legal grounds. And yet there is no difference between such an extortion and the requisition upon a land owner to pay for a public improvement over and above the exceptive benefit received by him. It is true that the power of taxing is one of the high and indispensable prerogatives of the government, and it can be only in cases free from all doubt that its exercise can be declared by the courts to be illegal. But such a case, if it can ever arise, is certainly presented when property is specified out of which a public improvement is to be paid for, in excess of the value specially imparted to it by such improvement. As to such excess, I cannot distinguish an act exacting its payment from the exercise of the power of eminent domain. In case of taxation the citizen pays his quota of the common burthen; when his land is sequestered for the public use, he contributes more than such quota; and this is the distinction between the effect of the exercise of the taxing power and that of eminent domain. when, then, the overplus beyond benefits from these local improvements is laid upon a few landowners, such citizens, with respect to such surplus, are required to defray more than their share of the public outlay, and the coercive act is not within the proper scope of the power to tax. And as it does not seem practicable to define the area upon which a tax can be legitimately laid, and beyond which it cannot be legitimately extended, and as there is, as has been shown, necessarily a limit to the power of selection in such instances, the principle stated in the case cited is, perhaps, the only one that can be devised whereby to graduate the power. Consequently, when the improvement, as in the present instance, is primarily for the public welfare, and is only incidentally for the benefit of the landowner, the rule thus established ought to be rigidly applied and adhered to.'

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, and not to be the means of oppression or extortion of the highest or the most weak and humble citizen.

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, and carried to the types. Any carelessness on the part of the feeder results in bad printing and the spoiling of sheets. Measured by the manual force expended, the feeder's labor is slight; but no press can be run, not even for the smallest job, unless the feeder is on hand to place the sheets, while his inexorable weekly wages are a serious expense in every printing office. Many have er and wiser rule for that State, in a recent decision made been the attempts made, extending over a period of twentyhand 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 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 impres ion 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, wideawake 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 peniusula, 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

tempts 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 feeder which is, apparently, the perfection of success. It 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. Anti mony 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 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 Bandelkband. 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 east 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 crystaline grottos of in describable beauty. Another kind of salt is found in great quantities in the Trans-Indus county of Afganistan, occuring 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 coalfields of promise are those of Upper Assam. The geological age of these coals, long in dispute, has now 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 Rewab, Sirguja, Bilaspur, Chutia, Nagpur, and the tributary mehals of Orissa. 3. Those of the Nerbudda valley and the hills to the south of it. 4. Those of Chanda

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 tuns a year, ten times the yield of all the other fields together. The seams which are mined vary in thickness from 41 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

five years past, to substitute mechanism for this species of oxide of copper, with copper glance occasionally; but at 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 thick-

> 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 crystaline 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 rooks; 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 iustances 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 vielded 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 ciry, 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 cooperation.

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

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 in formation and documents must be addressed to W. P. An derson, Secretary, Cincinnati, O.

POWDERED chalk, added to common glue, strengthens it A glue which will resist the action of water is made by boilmostly concentrated in one bed of great thickness, consisting ling one pound of glue in two quarts skimmed milk.