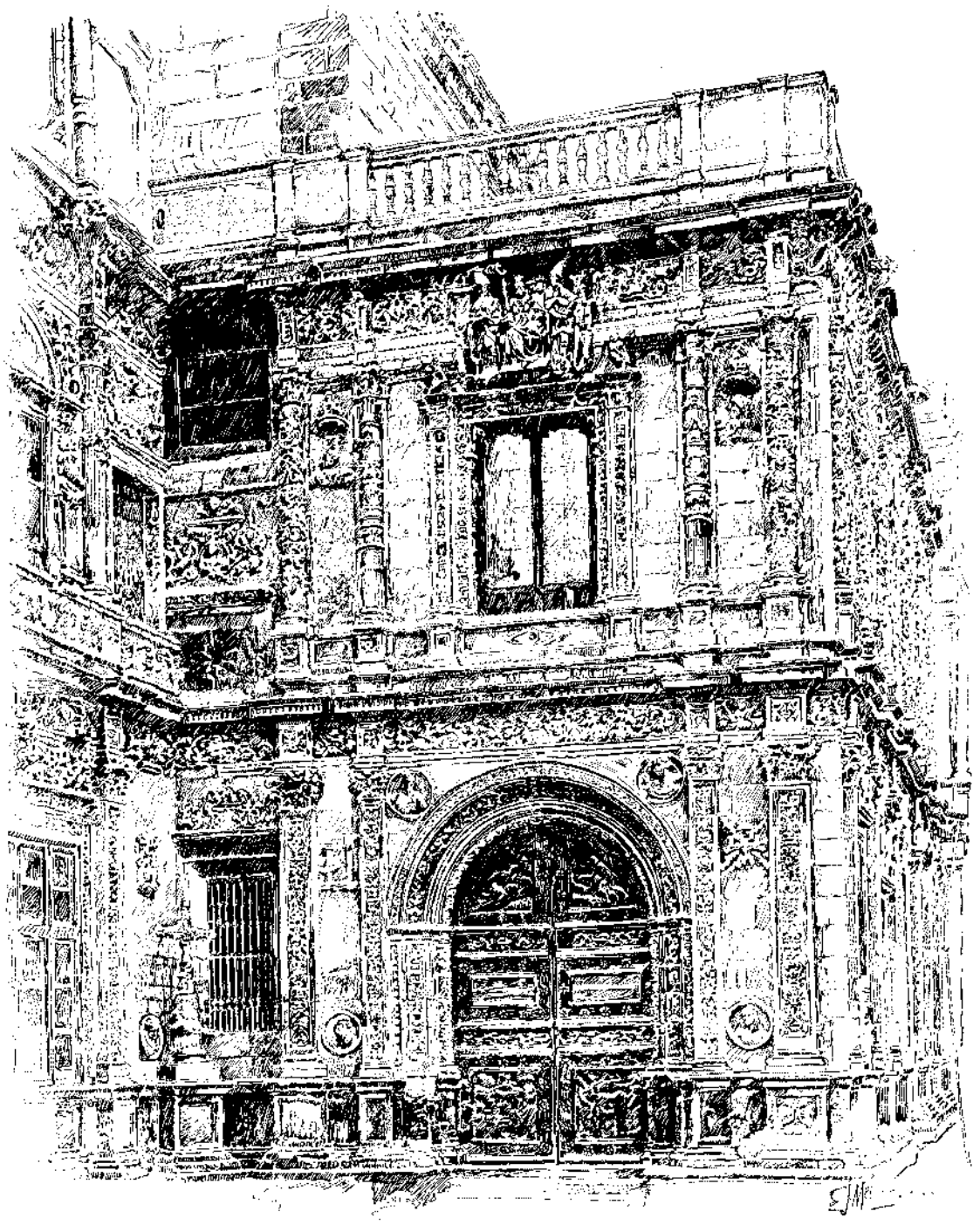
A PORTION OF THE HOTEL DE VILLE, SEVILLE, SPAIN.

Seville, situated on the left bank of the Guadalquivir River, 355 miles south-southwest of Madrid, is one of the most picturesque and interesting cities in Europe. Its cathedral, second only to St. Peter's at Rome, as regards size; the Moorish Giralda, the bell tower of the cathedral; and the Alcazar, the magnificent palace which is the chief relic of the Arab domination in Seville, are all world-renowned objects of interest. Hardly less interesting is the Casa del Ayuntamiento, the town house, or Hotel de Ville, as it would be called north of the Pyrenees. This beautiful Renaissance building offers a pleasing contrast to the Moorish edifices which abound in the old city. The Ayuntamiento was begun by Herrera, the Spanish architect, in 1545. The facade is divided into two unequal parts, the smaller of which contains an open porch or vestibule, as shown in the illustration, and is covered with a profusion of ornament that suggests the rich facade of the Certosa of Pavia. The other portion of the front is without ornament from the ground to the first story, along the front of which runs a series of open arches supported by columns. The rich carving is executed in a style called plateresque, which rather uncouth term is used to denote work in stone that resembles the art of the silversmith. Owing to the softness of the climate, the rich carving still exists in undiminished splendor. For our engraving we are indebted to the Engineering Record.



HOTEL DE VILLE, SEVILLE, SPAIN.

The Vaccination of Land.

Some of the most extraordinary agricultural experiments ever undertaken, considered both practically and scientifically, are described in Le Genie Civil. Every one who has ever owned a lawn knows that to plow the ground at intervals, and raise a crop of certain vegetables, improves the subsequent growth of grass; and a drive through the suburbs of any large city will show lawns undergoing this treatment, sometimes with a crop of potatoes, sometimes with beans, according to the notions of the owners, or their gardeners. The process by which this alternation of crops improves the soil has never been very clearly explained. Most people suppose that the repeated digging up of the earth, to plant the potatoes, and harvest the crop, is the secret of the success of the treatment, but chemists have fancied for many years that, in such rotations of crops, one set of plants might have the power of absorbing nitrogen from the atmosphere, and conveying it to the soil. With this idea, a long series of experiments was carried out fifty years ago, by the greatest chemists in Europe, who analyzed various plants, the air in which they grew and the soil, before they were planted, during their growth, and afterward, and came to the unanimous conclusion that the absorption and storage of nitrogen by growing plants was an impossibility.

For all this, farmers continued to observe that certain plants, particularly of the leguminous tribe, such as clover, lucerne, sainfoin, and some others, instead of exhausting the soil, seemed to enrich it, so that, even after the leaves and stems had been cut and carried away, the roots alone, left in the ground, sensibly increased its fertility. Analysis showed that these roots contained a considerable quantity of nitrogen. If, according to Boussingault, Lawes, Gilbert and others, it was impossible that this nitrogen should be derived from the atmosphere, it must be drawn from nitrogenous matters in the soil. The inference would be, in this case, that nitrogenous manures would be beneficial to crops requiring so much nitrogen for their growth; yet it is well known to farmers that these plants not only derive no benefit from nitrogenous fertilizers, but are injured by them, while, although through the nitrogen contained in their roots they improve the soil greatly for succeeding crops of other plants, they injure it for themselves; and leguminous crops, cultivated too long in the same ground, become sickly. It was not until a few years ago that science and observation were reconciled, by the persistent investigations of MM. Hellriegel and Willfarth, who demonstrated beyond question the fact that the leguminosæ do, in growing, absorb large quantities of nitrogen from the air, but with the singular condition that the absorption of nitrogen begins only with the appearance of a diseased state, which is marked by the development of tubercles, about the size of a millet seed, on the roots, and is, apparently, caused by minute animals, which are always found in the tubercles, and seem to give the plant the nitrogen-absorbing power. Further investigations showed that the young, healthy plants lived on the nitrogen already contained in the soil, and that it was not until this was exhausted, and the plants began to suffer, that the nitrogen-absorbing excrescences made their appearance; and proved, also, that the tiny inhabitants of the tubercles were, as a rule, confined to one species of plant, the acacia microbe, for example, refusing to live on the bean, or the clover microbe on the lentil.

It is evident that a plant capable of absorbing nitrogen, which is a costly as well as indispensable adjunct to farming, and of storing it up in the soil for its master's profit, is a valuable possession; and, as only diseased plants have that property, it is obvious that it is desirable to spread the nitrogen-storing disease. With this view, several skillful farmers in France and Germany have, within the past two or three years, been trying experiments, by "vaccinating," as they say, fields of leguminous plants, by sprinkling them with earth in which tuberculous plants have been growing, or water in which they have been soaked; and the results have been extraordinary. Analysis has shown that a single crop of tuberculous leguminosæ, if the tops are plowed in, adds to the soil from five to twelve thousand pounds of nitrogen, worth from eighteen to forty-five dollars, to the acre; and even when the tops are cut and carried away, there is enough nitrogen left in the roots to insure a good crop of cereals on the same ground the next season, without other fertilizer. In 1890, a tract of old, peaty soil was "vaccinated" with a ton and a half to the acre of earth from a diseased field. Besides this, five hundred and twenty pounds to the acre of scoriæ from a dephosphorating furnace were spread over the ground, and about a thousand pounds to the acre of kainite, but very little nitrogenous manure. The tract was then sown with clover, which produced nearly three tons of hay to the acre. The next year, a virgin peaty soil was treated with half a ton to the acre of sand, from a field which had borne a crop of "serradelle," a small leguminous plant, unknown to us. The sand was harrowed in. No other manure of any kind was put on. The ground was sown with winter rye. In May, thirty-five pounds to the acre of serradelle seed was sown among the rye. The rye produced a good crop, and, after the harvest, the serradelle, which had absorbed and fixed about sixty pounds to the acre of atmospheric nitrogen, was plowed in, as green manure. The next year, the land was planted with potatoes, and similar potatoes were planted in neighboring fields, which had not had the new treatment, but were simply enriched with barn yard manure. At the harvest, the yield from the vaccinated fields, which had received no other manure, was from twenty-eight to sixty-two per cent greater than from the manured fields, according to the variety planted. The most surprising result from the treatment appears, however, to have been obtained in Prussia, where a tract newly brought under cultivation was divided, and part vaccinated with earth from a lupin field. The whole was then sown with lupins; and the yield from the vaccinated portion was five and one-half times as great as that from the other portion, for equal areas.—Amer. Architect.

Return of the Peary Expedition.

All of the members of the Peary main and auxiliary expeditions, with the exception of Messrs. Peary, Lee and Henson, returned to St. John's, N. F., Sept. 15. Lieut. Peary and his two companions will remain at the headquarters, Falcon Harbor, to conduct their explorations next year.

On October 31, 1893, an immense tidal wave swept away half of the oil which was used for heating and lighting and destroyed the launch and dories. The winter was spent in preparations for the inland ice journey to Independence Bay, which began on March 6, with a party of eight men, twelve sledges and ninety-two dogs. The burros and carrier pigeons were useless. The party arrived at Anniversary Lodge with twenty-four dogs and no sledges, having advanced only 134 miles in thirty-one days. The party was divided, and Peary, Baldwin, Entrikin and Clark pushed on. At last, when it became evident that Independence Bay could not be reached in the summer of 1894, the return trip was begun. In the equinoctial storm, which lasted for four days, the explorers suffered from the intense cold, the temperature at times being as low as 60° below zero, while for thirty-four consecutive hours the wind blew forty-eight miles an hour. It is believed that this weather is the worst to which any Arctic explorers have been subjected.

Though the expedition has ended in failure as regards the main object of the trip, still good work was done in surveying and mapping out quite an extent of hitherto unknown coast line. Messrs. Peary and Lee are also the first white men to see, measure and locate the iron meteorite near Cape York. It is expected that this meteorite will be brought home next year. The auxiliary expeditions made some valuable explorations in the Carey Islands, at Cape Faraday and at Clarence Head.

Logarithms.

An expert engineer in a New England city rendered a bill to a corporation who had employed him to write a technical report. The amount of the fee was large, the corporation refused to pay it, and the claim was carried into court.

During the trial the counsel for the corporation sought to belittle the expert's work, raising questions as to his experience, and, in fact, to prove that his labor would have been amply rewarded with a few dollars a day.

"How did you reach this result?" asked the lawyer, referring to a certain calculation which had involved the use of logarithms.

"I consulted Napier's table and"—but he got no further.

"You consulted Napier's table, did you?"

"Yes."

"Do you mean to tell this court that you, an expert, had to resort to a published table? Did you prove the figures of that table?"

"No; but they have been proved. They are considered to be accurate by every scientific man."

"Why do you not work out your own table of logarithms? Is it not because you are unable to do so?"

"It is not. I am perfectly capable of preparing such a table, but it would have taken too long a time to do so, and so I consulted the standards."

"In order to prove your calculation as well as your capabilities in this matter," continued the suspicious lawyer, "I will now ask you to prepare a table of logarithms."

"Here and now?" inquired the plaintiff. "I fear it will consume too much of the court's time."

This seemed to confirm the lawyer's doubts, and so he insisted the more upon having a complete table of logarithms prepared.

The plaintiff smiled maliciously, took paper and pencil and began his work. In about five minutes the lawyer asked him if he had finished. The plaintiff shook his head and continued at work. Ten minutes passed by and again the question was put:

"How nearly finished are you?"

"Very far from finished," remarked the plaintiff.

"Well, may I ask how long it will take you to prepare a table such as Napier's? You seem to be very slow about it."

The expert hesitated a little and then replied: "I estimate that, working alone, I might be able to complete it in about fifteen years, working day and night. It took Napier and five assistants seven years to prepare his table, but I am less familiar with the calculation than he was, and, as you say, work slow. Still in fifteen years I think I can complete it."

It is unnecessary to say that the lawyer was not a little taken aback by the answer, which enlightened him a trifle on the subject. He withdrew the questions, and eventually the expert won his case.—New York Herald.

Dentistry in China.

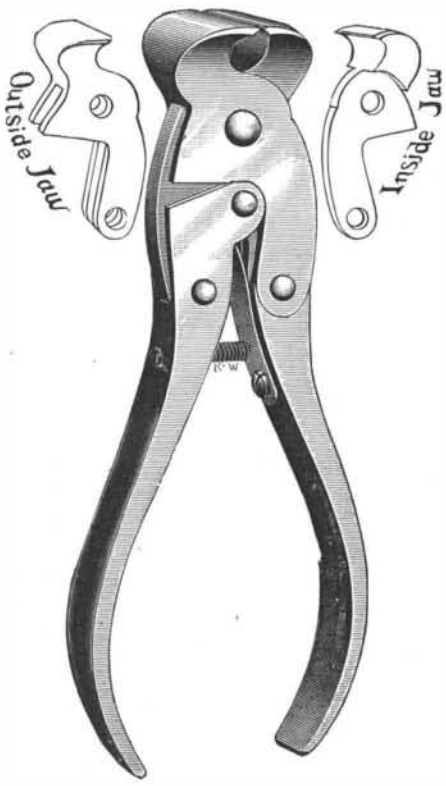
In the department of dentistry the Chinese have, strange to relate, anticipated by centuries the profession in Europe and America in the insertion of artificial teeth. Utilizing the femur of an ox, and sawing a circle of half or three-quarters of an inch from the shaft, a section of this circle is used sufficient to fill the vacant space in the mouth. The section of bone is then dressed with a file, so as to imitate the teeth to be replaced, and through holes drilled in each end, copper wires are passed to fasten it to the adjoining teeth. These artificial teeth are designed more for good looks than for purposes of mastication, and since the cost of inserting three or four teeth amounts to about twenty-five or thirty cents, this means of remedying uncomely defects is within the reach of all.

American and English dentists of high standing have practiced their profession in Hong-Kong, Shanghai, and other cities open to foreign commerce, and have employed Chinese young men to assist in the mechanical part of the work. With the talent for imitation for which the race is noted, these young men have not been slow to avail themselves of the opportunity of learning the more delicate parts of the work performed by the dentist himself. A number of these young men have become successful practitioners among their own countrymen, and with foreign instruments and material, are superseding the crude and unsatisfactory work of the native artists. They have not yet attained to the skill in the treatment of diseases of the mouth which requires scientific knowledge, but that will come in time.

The theory that toothache depends on the presence of worms in decayed teeth is universally believed, and is demonstrated by a process peculiarly Chinese, and which was investigated some years ago by Dr. Rogers, a dentist of Hong Kong, and myself. The native operator holds back the lips with a wooden spatula while he works around the offending tooth with a pointed instrument until there is a flow of saliva and blood; adroitly turning the spatula and placing the other end in the mouth, a piece of delicate paper attached to one side is moistened by saliva and the worms, confined under it, are liberated, and become mixed up in bloody saliva. With a pair of forceps the operator picks them out and satisfies the patient.—J. G. Kerr, Dental Register.

A POWERFUL CUTTING NIPPER.

It will be seen by the arrangement of the jaws of this nipper that it gives great power with rigidity. It forms one of an extensive line of fine tools, such as calipers, dividers, gauges etc., made by the J. Stevens Arms and Tool Company, of Chicopee Falls (P. O. box No. 280), Mass. The nipper will cut wire

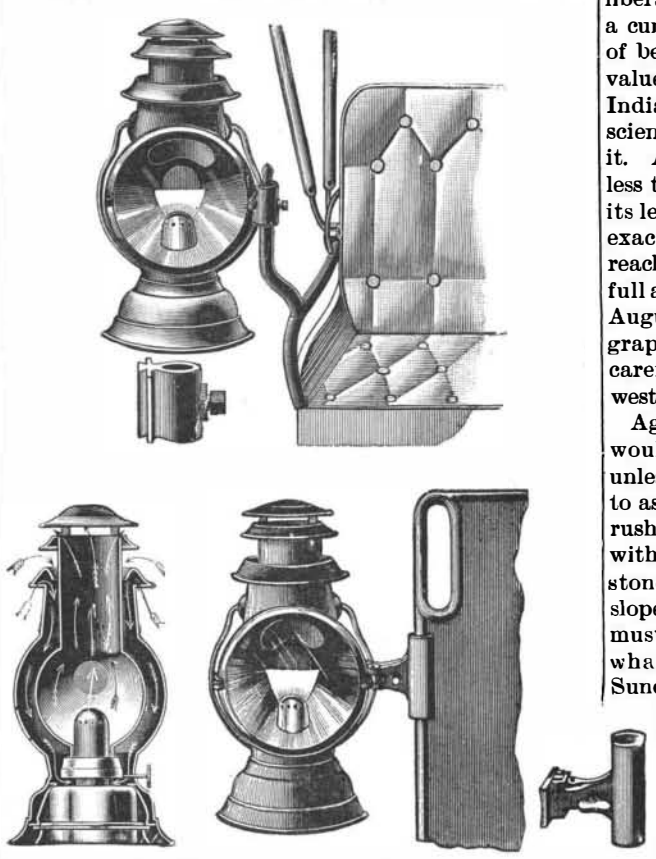


A POWERFUL CUTTING NIPPER.

at either extreme of the jaws without the opposite end closing faster than the cutting end. It is well adapted for cutting music wire and other severe work.

A CONVENIENT CARRIAGE LAMP.

The number of poorly burning, smoky, badly located carriage lamps which one can readily observe, lamps which serve rather to "make the darkness visible" than illuminate the roadway over which one is traveling, would seem to afford a good field for the introduction of a really efficient and simple lamp. Such a lamp, as



THE "DIETZ" TUBULAR DRIVING LAMP.

made by the R. E. Dietz Company, of No. 77 Laight Street, New York City, is represented in the accompanying illustrations. Its tubular construction, with the double sides forming an air chamber down which the air passes to the flame, as shown by the arrows in one of the views, insures a perfect combustion unaffected by wind or the jar of travel, and the reservoir is designed to hold a ten hours' supply of kerosene, without refilling. The front of the lamp consists of a beveled, moulded lens, and at its back is a small lens of ruby glass giving a brilliant point of crimson light at the rear. One of the views shows an attachment for securing the lamp to the left side of the dash, and another illustrates a fitting with which it may be placed on the side brackets of a carriage. The lamp can be attached in a moment to the front or side of the dash, or to the bracket, and the light is thrown straight ahead.

The Gohna Flood.

The story of the Gohna landslip and its sequel is so extraordinary that it deserves to be told in some detail, now that the bursting of the dam and the flooding of the valley have taken place in the exact manner and almost on the exact day which had been foreseen. We are enabled to do this through the careful investigations of Mr. Thomas H. Holland, published in the latest issue of the records of the Geological Survey of India. The scene of this curious story is in a Himalayan valley, in the district of Garhwal, between the sacred city of Hardwar on the Upper Ganges and the Tibetan frontier. It is a land of immense mountains, separated by valleys so narrow that they may almost be called ravines. The chief of these is the valley of Srinagar, through which runs the river Alaknanda, an object of profound reverence to devout Hindus. A tributary of this river is called the Birahi Ganga, and eight miles above its junction with the larger stream is the small village of Gohna, situated 160 miles from Hardwar. Close to Gohna was a hill called Maithana, precipitous in form, and composed of dolomitic rock. On September 6, 1893, almost exactly a year ago, toward the close of the rainy season, a tremendous landslip took place here, nearly the whole hill falling into the valley and damming the stream so as to form a long, deep lake. "Falling," writes Mr. Holland, "continued for three days with deafening noise and clouds of dust, which darkened the neighborhood and fell for miles around." The falls continued at intervals for several months, and at the time of Mr. Holland's visit last March "a day's rain or fall of snow was always succeeded by falls—blocks of several tons came bounding from ledge to ledge for more than 3,000 feet over the broken hill face with a low rumbling noise and the production of clouds of dust." In March the dam formed an exposed surface of 423 acres, but the river had already become a lake of two and three-quarter miles in length, and this was growing steadily, the dam being, of course, gradually submerged by the mounting waters. At that time the rate of rising was six inches a day, but with the melting of the snows in the hot season it was known that the rise would be more rapid.

The geologists, however, were not content with vague prophecies such as must have occurred to unaided common sense. The question for them was, At what precise time will the lake reach the top of the dam, and what will then be the precise course of the liberated waters? The answer to these questions offers a curious instance of exact scientific prevision, worthy of being put on record as such, and of high practical value as an instance of what is done for the people of India by a government that has at command the best scientific ability and the power of making full use of it. At the time of Mr. Holland's visit, the lake was less than three miles long, and before it could overflow its length must reach seven miles. Yet the date was exactly calculable, as was the course of the water after reaching the limit. "The lake," he wrote, "will be full and will overflow the barrier about the middle of August. Means of recording by instantaneous photographs the effects of the water on the dam are being carefully arranged by the government of the Northwestern provinces."

Again, speaking of the point at which the overflow would begin, the writer said, "When full the lake will, unless a cutting is made, overflow at the point referred to as 5,850 feet above the sea level; and the stream, rushing down an incline of 11 degrees, will rapidly cut with increasing head a channel in the mud and loose stones, until its speed is checked by the reduction of slope and the exposure of large blocks of dolomite which must occur below at no great depth." This is just what has now occurred. The water reached the top on Sunday morning, August 26, and by midnight had begun to escape in great volume. The heavy rush took place at night, and by 4:30 A.M. some 320 feet of water had escaped, the lake sinking to a quarter of its maximum size in that short space of time. It can easily be imagined that the rush of water down the valley was prodigious, and we need not be surprised to read that great destruction of buildings took place between Gohna and Hardwar. But, in spite of this tremendous outburst of force, no lives appear to have been lost, either in the valley or in the towns exposed to the water, though a column six feet deep is reported to have made its swift way through Hardwar. The administration had exerted itself splendidly, and its work was crowned with complete success. Telegraphic warnings had been flashed down the valley, and every man had been told beforehand exactly what to expect. The warnings were listened to, and every human being appears to have kept safely out of the way.—London Times.