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ment, it was a matter of common observation with us that such an instance *was absolutely never met with*. Among thousands, and hundreds of thousands, the ligament was always preserved intact. 4°. As to the astute creature 'allowing the animal to freeze and open,' we will not attempt to question that. It may occur to some readers that it would be rather monotonous for the hungry rat to wait during the hot summer nights (even at 'the west and south') for the stupid mussel to 'freeze and open.' That, however, is his business, not ours. W. H. PRATT.

Davenport, Io., Jan. 28.

THE GEORGIA WONDER-GIRL AND HER LESSONS.

THE people of the interior states are now being amused by an exhibition the success of which offers a striking example of the unreliability of human testimony respecting the phenomena of force and motion. Some months since, the writer received a polite invitation to witness the wonderful performances of Miss Lulu Hurst, the Georgia 'magnetic girl,' in causing objects to move as if acted on by powerful forces, without any muscular action on her part. Another engagement prevented his acceptance; but, on the morning following, he received such a description of the phenomenon as to make him regret that he had not sacrificed every thing to the opportunity of seeing it. It was substantially this:—

A light rod was firmly held in the hands of the heaviest and most muscular of the select circle of spectators. Miss Lulu had only to touch the rod with her fingers, when it immediately began to go through the most extraordinary manoeuvres. It jerked the holder around the room with a power which he was unable to resist, and finally threw him down into one corner completely discomfited. Another spectator was then asked to take hold of the rod; and Miss Lulu, extending her arms, touched each end with the tip of a finger. Immediately the rod began to whirl around on its own central line as an axis, with such rapidity and force that the skin was nearly taken off the holder's hands in his efforts to stop it. A heavy man being seated in a chair, man and chair were both lifted up by the fair performer pressing the palms of her hands against the sides of the back. To substantiate the claim that she herself exerted no force, the chair and man were lifted without her touching the chair at all. The sitter was asked to put his hands under the chair: the performer then put her two hands around and upon his in such a way that it was impossible for her to exert any force on the chair except through his hands; yet the chair lifted

him up without her exerting any pressure heavier than a mere touch upon his hands. Several men were then invited to hold the chair still. The performer began to deftly touch it here and there with her fingers, when the chair again began to jump about in the most extraordinary manner, in spite of all the efforts of three or four strong men to keep it still or to hold it down. A hat being inverted upon a table, she held her extended hands over it. It was lifted up by what seemed an attractive force similar to that of a magnet upon an armature, and was in danger of being torn to pieces in the effort to keep it down, though she could not possibly have had any hold upon the object.

This was the account of the performance given, not by a gaping crowd nor by uncritical spectators, but by a select circle of educated men. To the reminder that no force could be exerted upon a body except by a reaction in the opposite direction upon some other body, and to the question upon what other body the reaction was exerted, the narrators expressed themselves unable to return an answer. All they could do was to describe things as they had seen them. Of only one thing could they be confident: the reaction was not exerted through or against the body of the performer. Among the spectators were physicians and physiologists who grasped Miss Lulu's arms while the extraordinary motions went on without finding any symptoms of strong muscular action, and who, feeling her pulse after the most violent motions, found that it remained in its normal state. Apparently the objects which she touched were endowed with a power of exerting force which was wholly new to science. Altogether, the weight of evidence seemed as strong as in the best authenticated and most inexplicable cases of 'spirit' manifestation, while none of the obstacles to investigation connected with the latter were encountered.

Such was the case as it appeared on a first trial; but the spectators were not men to be satisfied without further investigation. Accordingly, they had made arrangements with the managers to have another private exhibition at the Volta laboratory two days later. They proposed also to have decisive tests to determine whether or not she exerted any force upon the objects which she moved.

The party duly appeared at the appointed time. At this point I think it only just to mention the perfect frankness with which the most thorough investigation of the case was permitted by those having the exhibition in

charge. There was no darkening of rooms, no concealing hands under tables, no fear that spirits would refuse to come at the bidding of a sceptic, no trickery of any sort. The opportunities for observation were entirely unrestricted.

Miss Lulu was a rosy country girl, somewhat above the average height, but did not give the impression of muscular training; still, when she was presented to those present, the first thing which struck the writer was the weight of her arm. Shaking hands with her felt like moving the arm of a giant, and led to the impression that she had a much better muscular development than would have been supposed.

Before proceeding to the tests which had been pre-arranged, it was thought best to try what she could do under ordinary circumstances. Among the first performances to be tried was that of the hat. A spectator held a light straw hat in his hands, the opening upwards. Miss Hurst extended her hands over it so that the balls of her thumbs just touched the inner face of the rim. At first there was no result, but after a few trials the hat was gently attracted upwards as if by electricity. Had those in charge been professionals, I cannot doubt that they would have stopped right there, and declined to repeat the performance. Not being such, they yielded to the invitation to go on, so that the holder could see how it was done. This was soon effected without difficulty. Whenever the apparent attraction was exerted, it was through the inner edge of the brim being caught in the fold of the ball of the extended hand. After a few moments the observer was enabled to say, "She cannot lift it now, because her hand is not rightly arranged," and he learned to adjust her hand so that the lifting could be executed. Of course, the force was not very strong. The idea that the hat would have been in any danger had a weight been in it was simply a mistake.

Next the jumping-staff was tried. The writer took the latter in his hands, and Miss Lulu placed the palm of her hand and her extended thumb against the staff near its two ends, while the holder firmly grasped it near the middle. He was then warned to resist with all his force, with the added assurance that the resistance would be vain. Sure enough, the staff began to be affected with a jerking motion, producing the disastrous effects which had been described upon the holder's equilibrium. An unwise repetition of the performance, however, did away with all its mystery; for, although the performer began with a

delicate touch of the staff, the holder soon perceived that she changed the position of her hands every moment, sometimes seizing the staff with a firm grip, and that it never moved in any direction unless her hands were in such a position that she could move it in that direction by ordinary pressure. An estimate of the force which she exerted on the staff could be roughly made. It might have been as high as forty pounds. A very little calculation will show that this would be sufficient to upset the equilibrium of a very heavy man. It is impossible for the latter so to place his feet that he will be supported on a rectangle of more than one foot in breadth. He may indeed change at pleasure the direction of the longer side of this rectangle by extending his feet in different directions; but, arrange them as he will, his base will under any circumstances be a rectangle whose length is equal to the distance between his feet, and whose breadth is at the very maximum equal to the length of his feet. A pressure of one-fifth his weight would, under the most favorable circumstances, throw him off his balance, and make a new adjustment necessary. The motion given by the performer to the rod was not a regular one, which could be anticipated and guarded against, but a series of jerks, first in one direction, and then in another; so that it was impossible for the holder to brace himself against them: consequently, by a force which might not have exceeded forty pounds, he was put through a series of most undignified contortions, and finally compelled to retire in total defeat.

The holder of the rod then asked that it might be made to whirl in his hands in the manner which had been described to him. No attempt was made to do it, and no satisfaction on the subject could be obtained. It was evidently a simple mistake in memory or narration, for not even Miss Lulu seemed to have any idea of producing such an effect. The lifting of the chair with the sitter's own hands under it, and Miss Lulu's hands under his, was then tried. The simplicity of the blunder was most striking. It was quite true that the fingers of the performer were under those of the sitter. But the chair refused to budge until the ball of her hand came firmly in contact with it; and then it proceeded, not indeed to lift the sitter, but to incline itself in such a way that he felt compelled to get out of it. The chair was made to repeat its performance a great number of times. The writer watched most carefully, and, in every instance in which he was able to see the performer's hands at the time of the motion, the ball was pressed firmly against the

chair, and the direction of motion was that of the pressure.

Three men, or indeed as many as could get hold of the chair, were then invited to hold it still if they could. This was the most amusing and exciting part of the spectacle. The men tried in vain to hold the chair still, while Miss Lulu simply moved around in the quietest imaginable way, touching it with her finger first here and then there, until finally the force became so great that the chair began to crack, and seemingly almost pull itself to pieces. The explanation was, however, perfectly obvious. There was no concert of action among the four muscular holders, more than that each one tried to keep the chair still by resisting any force which he felt it to exert. A few jerks in various directions by the performer led them to begin resisting her motion by pulling the chair first this way and then that. It was of course impossible for any one holder to tell whether the motion came from the performer or from his companions. The result was, that they all began to wrench desperately against each other until the chair came to pieces.

The scientific tests were productive of the usual result, — that ghosts, spirits, and occult forces absolutely refuse to perform their functions in the presence of scientific paraphernalia. A platform had been placed on rollers in the middle of the room, and Miss Hurst was invited to set the rod in motion while she stood on that platform. Her parents were perfectly confident that she could do it, and she did go so far as to commence one feeble attempt; but the forces refused to operate, or rather the platform persisted in rolling about, and the attempt had to be given up. She then stood upon the platform of a pair of scales, the counterpoise of which was so adjusted, that, when she exerted a lifting-force exceeding forty pounds, the arm would be raised. A spectator sat in the chair in front of the scales. It was soon found, that, owing to the platform being some six inches above the floor, the chair was lower than she had been accustomed to have it: it was therefore set upon a little platform of the same height as that of the scales, so that the position was the same as if both stood on the floor. The performer pressed her hands against the sides of the back of the chair, according to custom. The motion was long in commencing, and, when it began to appear, click! went the lever of the scales, showing that a force of more than forty pounds was exerted. This seemed to demoralize the performer, and, notwithstanding a great deal

of chiding from her parents, nothing more could be done while she stood in this position.

From various allusions in the public press, it would seem that the wonderful 'magnetic girl' has not yet ceased to draw full houses. The editor of the Chicago *Inter-ocean* made a careful investigation of the case, and showed that it could not possibly be electricity which caused the motion; but he does not essay an explanation of what the force was.

Although it would be unjust and pretentious to say that no one sees the absurdly simple character of the performance, it would appear that there are many who are mystified by it, and that, should we accept the existing testimony on the subject as complete, we should be compelled to admit that some new form of force had been discovered. It is indeed possible that the absurd simplicity of the affair may help to give it vitality; for, as already indicated, not only is there no mystery or concealment, but there is not even a resort to the tricks of legerdemain, which consist very largely in distracting the observers' attention at the critical moment. The assumption, that, because Miss Lulu begins by touching the articles deftly with her fingers, she never takes them with a firm grip, is one which the spectator takes upon himself without any effort on the performer's part to cause that illusion.

This account is presented to the readers of *Science*, because, taken in connection with descriptions of the performance given by thousands of spectators, many of them critical observers, it affords the basis of a reply to those who have seen chairs, tables, and pianos dance without human agency.

S. NEWCOMB.

THE NANTUCKET MUSEUM.

THE little town of Nantucket, on the island of that name off the southern coast of Massachusetts, boasts a little museum *sui generis*. The first thing which strikes a visitor is the extremely heterogeneous character of its collections. It is certainly amusing to see, side by side with specimens of rare interest and scientific value, such entirely valueless things as pieces of melted glass from the Chicago fire, and bits of wood from the frigate *Constitution*; but most of the 'curiosities' have some local value, being connected with the past whale-fishery, and were collected by the whalers of the town in their wide wanderings. Hanging on the walls, lying on the tables and even on the