— Brown, Thurston, & Co., Portland, Me., announce the completion of the six volumes of the "York (Me.) Deeds." This work, which has been in progress for the past six years, is one of the most important historical and antiquarian publications relating to the early history of New England that has ever been published, being of particular value and interest to the people of Maine, New Hampshire, and Massachusetts, as in it is found a large portion of the unknown and unwritten history of those States. The work was done under the direction and patronage of the Maine Historical Society and the State of Maine.

— Of *The Ladies' Home Journal* it is said that it has the largest actual paid circulation of any magazine in the world; it had on its books at last count 422,356 paid annual subscribers, with a subsequent daily increase; it prints and sells each month 500,000 copies; it has two editions a year of one million copies each; it goes monthly into 35,000 post-offices throughout the United States and Canadian provinces; it has regular paid subscribers in 46 of the 60 countries of the civilized world; it has a subscriber in almost every English-speaking nation of the globe; it requires 8 large cylinder presses, running an entire month, to print a single edition; it has over 5,000 employees, agents, and subscription canvassers in its employ; it has a working staff of 80 writers and 14 editors, besides artists and engravers.

— In *Lippincott's Monthly Magazine* for January a feature of especial interest is the publication of the first part of some unpublished manuscript of Nathaniel Hawthorne's, — a weird tale entitled "The Elixir of Life." This is a version of the theme of "The Bloody Footstep," also treated by Hawthorne, in "Dr. Grimshawe's Secret," "Septimius Felton," "The Dolliver Romance," etc. Mr. Julian Hawthorne, who edits the manuscript, by drawing attention to the similarities and discrepancies between this and other versions, presents a study of the great romancer's methods of work, and, by paraphrasing such portions of the manuscript as are repeated in the published stories above named, imparts to the whole the character of a complete tale. "Nathaniel Parker Willis" is the theme of R. H. Stoddard's study of American authors. This paper is one of a series of critical articles which Mr. Stoddard has contributed to *Lippincott's*. In an article entitled "Newspaper Fiction," William Westall, the popular English novelist, tells of the growth of the syndicate idea in England. "The Theatrical Renaissance of Shakspeare" is contributed by Edward Fuller, the dramatic editor of the *Boston Post*, who reviews the extraordinary revival of Shakspeare's plays at our theatres during the season of 1888 and 1889. The article is full of suggestions concerning the setting of the plays, and also of criticisms upon modern actors. In "Under the Mistletoe," Henry Collins tells about the origin of the custom of kissing under the mistletoe; and Miss Anne H. Wharton, in "Our Winter Festivities," gives the origin of many of our Christmas and New Year customs.

— A. E. Kennelly, Mr. Edison's chief electrician, who has so frequently been called as an expert in important litigations, will contribute to the January *Scribner's* the sixth article in the electric series, entitled "Electricity in the Household," which is a popular discussion of the numerous devices that can be conveniently applied to every modern home where comfort is aimed at. The article will be illustrated. In his very interesting and timely article on "Water Storage in the West," Walter Gillette Bates discusses in the same number some of the reasons which may make it advisable that in the near future the government should undertake the whole question of reclaiming the arid regions of the West by an immense system of artificial dams and lakes. Of the Eiffel Tower, W. C. Brownell says, "It was, however, not only not vulgar, but agreeable. Technically the Tour Eiffel was superb. It may have been intended merely to be astonishing, but in reality it was in the highest degree impressive." In his article on "The Beauty of Spanish Women," Henry T. Finck says, "If I were asked to state in one sentence wherein lies the chief advantage of Spanish women over those of other countries, and to what they chiefly owe their fame for beauty, I should say, that if a Spanish girl has round cheeks, and has medium-sized, delicately cut nose and mouth, she is almost certain to be a complete beauty; whereas, if an American or English girl has a good nose, mouth, and cheeks, the chances are still against her having a beautiful complexion, and fine eyes, hair, and teeth, which Spanish girls are always endowed with as a matter of course. But over and above every thing else, it is the unique grace and the exquisite femininity, unalloyed by any trace of masculine assumption or caricature, that constitute the eternal charm of Spanish women."

LETTERS TO THE EDITOR.

***Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

The editor will be glad to publish any queries consonant with the character of the journal.

On request, twenty copies of the number containing his communication will be furnished free to any correspondent.

A Peculiar Case of Adhesion.

A VERY singular case of adhesive power has come under my notice lately, and the results of an investigation made with the view of establishing its nature are recorded in the following lines.

Mr. Louis Hamburger of Baltimore, sixteen years old, and of rather delicate build, noticed for the first time, about the middle of November last, that a cane would, as he expressed it, "stick" to his fingers, and that wiping off the cane and washing his hands would not prevent this occurrence. Laying his fingers on other light articles, such as lead-pencils, penholders, etc., he found that he could lift them up by simply placing his fingers upon them, the objects adhering firmly to the skin. Not being able to explain these phenomena, Mr. H. came to see me on Nov. 19, and surprised me by performing a few of the experiments which he had learned to execute, and which consisted in the raising of various objects by their adherence to his fingers. The heaviest of these articles did not weigh twenty grams.

At a loss to understand the nature of these phenomena, I began a series of experiments, which, in the course of a few weeks, brought to light a number of facts more interesting, and even more startling, than those which had been observed by Mr. H. himself up to the time he first called upon me. The experiments performed were made with the view of determining (1) the quality and nature of the adhering substances, i.e., their chemical composition and texture; (2) the quality or weight of adhering masses, and their relation to the hand's surface brought into play in a given experiment; (3) the exact points or surfaces of the fingers or other parts of the body which exhibit this adhesive power; (4) the length of time during which substances will adhere.

Before stating the results of the various experiments made, I will mention that it was soon found that the hands had to be carefully cleaned by washing with soap and water, and then with alcohol and ether, in order to attain the highest degree of adhesive power; and that the surface of the articles experimented upon had likewise to be well cleaned, and rubbed absolutely dry. Particles of dust or moisture greatly interfere in all experiments where the highest power is demanded.

In regard to the first point of inquiry, the nature of the material which would adhere, it was easily proven that chemical composition had nothing whatever to do with the adherence. Metals, stone, glass, rubber, wood, etc., — all probably adhere equally well, provided their surfaces possess the same degree of smoothness. As a general rule, it may be stated that the adhesive power increases with the degree of smoothness of surface. It is for this reason only that well-polished metals or glass show the highest degree of adhesion. The latter substance answers especially well, because it can be cleaned easily. In proportion as the surface becomes less even, the adhesive power diminishes; and porous substances, such as paper, cloth, etc., or articles covered with them, cannot be made to adhere at all.

The second question, regarding the determination of the extreme limit of the weight of matter adhering, was found more difficult to answer. A number of factors influence the results of experiments made in this direction. It was found that not only the shape of the adhering mass had to be considered, but also the position of the hand itself. Cylindrical forms seem to be preferable, while flat surfaces adhere but poorly; and a much larger weight may be attached to the fingers while the hand is held perpendicularly than

when in a horizontal position. In order to reach some definite results, glass rods of different diameters were used. They were so arranged as to allow an increase of their weights by attachments, and so that the hand might be applied in a perpendicular position. When first examined, on Sept. 22, it was found that the extreme limit of weight which could be made to adhere, by means of a glass rod of 10 millimetres diameter, to the surface of the front part of the four fingers of the right hand, when held perpendicularly, was 1,450 grams. A glass tube of 20 millimetres diameter was next substituted, and would yet adhere when its weight had been increased to 1,900 grams.

When the experiments were repeated on subsequent days, the same glass tube could each time be loaded heavier, and Mr. H. can now lift the comparatively enormous weight of 2,610 grams, after having pressed his fingers tightly to the glass rod, which stands in a perpendicular position upon a metallic disk to which it is fastened, and which also carries the weights.

I ought to state that the thumb is never used to cause the adhesion, and that, in commencing a series of experiments, Mr. H. can never at the beginning lift the greatest weight. It appears that the power of adhesion increases during a series of experiments made within a period of fifteen or twenty minutes. So far, the power has continued to increase almost from day to day, but appears to have now reached its maximum. Following are the results of a few of the experiments made as described above; the first figure representing the diameter of the glass tube (in millimetres), and the second the maximum weight suspended (in grams): 5, 1,530; 10, 2,120; 15, 2,400; 20, 2,610; 25, 2,260; 30, 1,860.

The weights recorded above are nearly one hundred times greater than those which can be lifted by adhesion when the corresponding tubes are used horizontally. Exact measurements of that portion of the hand's surface which comes in contact with the adhering mass are difficult to make. However, the determinations were made sufficiently accurately to show that very nearly 3 square centimetres surface enter into action during the adherence of a 20-millimetre rod, when supporting 2,500 grams.

When the investigation was first begun, Mr. H. not only firmly believed in his utter inability to use his left hand as he did his right, but also looked for the seat of the adhesive power only in the front part of his fingers. It has now been demonstrated that the left hand does all the work equally as well as the right one, and that the surface of adhesion extends, though different in intensity, over almost the whole of the inner part of the hands. The power is strongest in the front part of the fingers, and weakest in the centre of the palm and on that portion of the fingers which is nearest to it. All the protruding portions, including the ball below the thumb, possess adhesive power, however. Neither the back of the hands, nor other parts of the body, including the surface of the soles and toes, show any signs of adhesion. The power of the hand to sustain objects may be shown by suspending upon it, for instance, four 6-inch test-tubes alongside of one another, or by applying an iron rod, a wooden stick, and a glass tube simultaneously to different parts of the hand. A test-tube adhering to the hand may be made to roll to and fro by jerking the hand backward and forward while the tube is in a perpendicular position.

The intensity of adhesive power in the various fingers differs widely. It is strongest in the index and middle finger, and weakest in the little finger; the latter doing so little work, that the three others may lift almost as much as the four. What is most singular is that one finger possesses very little power. The greatest weight shown to adhere to one finger has been about 35 grams, while two fingers may lift 1,400 grams. In order to decide whether or not the aid given by a second or third finger, in balancing or steadying the weight of the suspended mass, was the cause of this inability of one finger to do much work, three fingers were covered with a thin film of collodion, which rendered them unfit to act by adhesion, but not by their muscular support.

The experiments thus performed showed conclusively that the three fingers covered with collodion were absolutely unable to assist the fourth one. It can therefore not be the steadying power which causes two fingers to do forty times the work of one finger. That this should be so, might have been inferred from the fact that Mr. H. can suspend a combustion tube about four feet long on two fingers, and cause it to swing like a pendulum through a distance of at least three feet.

The length of time during wnich substances adhere depends chiefly upon their weight. Light objects, such as test-tubes, will remain suspended even horizontally for ten minutes or longer, and can then be removed only by the application of some force, when a slight click, caused by the concussion of air, can be heard. Very heavy articles will fall off sooner; but whether in consequence of a diminution in the adhesive power of the surface, or in consequence of the strain exerted upon the muscles, it is difficult to say. Another cause of the falling-off is to be found in the perspiration which at times oozes freely from the pores, and interferes greatly with the experiments.

It may be added, that neither the shape of Mr. H.'s hands nor the structure of the skin, even when examined under a magnifying-glass, shows any thing abnormal, though the skin is very soft and smooth. These are the principal results of the investigation made, and the next question is, how to account for the phenomenon. I need not mention the reasons which exclude the possibility of an electric or a magnetic action, because the facts presented show this conclusively. We therefore seem to be limited to a consideration of surface action, or atmospheric pressure, or both. The reasons for this assumption are, (1) that it has been found impossible to notice any attraction whatever exerted at a distance; (2) that the power increases with the cleanliness and smoothness of the surface, i.e., with the number of actual points of contact; (3) that the peculiar sound heard on breaking contact is characteristic of the concussion of air; (4) that the power increases with the increase of surfaces in contact, as shown in the experiments with glass tubes of different diameters.[1]

Whether, or to what extent, the pressure of atmospheric air induces these phenomena, I am unable to say. I have not had an opportunity to examine Mr. H. under a diminished or increased pressure, but hope to do so ere long. Certain it is, that the ratio of one square inch of adhering surface to fifteen pounds in suspended weight has not been exceeded, though approached to within twenty per cent. But even if air-pressure participates, as it most likely does, we have to assume that the skin of Mr. H. is peculiarly fitted to show these phenomena of skin-adhesion, and in a degree, to my knowledge, unnoticed heretofore. That he is not the only person possessing this power, I have good reason to believe. Among a large number of people examined, there were many whose hands showed at least signs of this power, and certainly a few who promised to develop it sufficiently to exclude doubt in regard to the occasional existence of the force. It may be well to warn persons who may try experiments, not to mistake for actual adhesion the suspension of tubes by means of counter-pressure exerted by portions of the terminal phalanges or the fleshy portions surrounding them. The unmistakable sign of adhesion is the performance of the experiments with the fingers kept absolutely close to one another, in which case it becomes next to impossible to exert counter-pressure. That muscular action may come into play in some of Mr. H.'s experiments is not absolutely impossible, yet very doubtful. I leave it to physiologists to furnish a more satisfactory explanation of these phenomena than I myself have so far been able to give.

W. SIMON, PH.D.

Baltimore, Dec. 16.

Convectional Currents in Storms.

READERS of *Science* will remember, that, in the numbers for May 10 and June 21 of the current year, there were given some computations of the probable effect of convectional currents and of the condensation of moisture carried by them into the cooler air strata above. These computations showed that there could be no liberation of energy from any such action. An interesting article has appeared in the *American Meteorological Journal* for December from the pen of Professor Davis of Harvard University, in which I find, "It is difficult to understand why this question should be so confused by Hazen, as appears in his recent articles. . . .

[1] That there is a decrease in power when the tubes are wider than 20 millimetres may be explained by the fact that those surfaces of the fingers which show the highest degree of adhesion are prevented from coming in proper contact with the surface of tubes, when of too large a diameter. This would account also for the poor adhesion of objects with flat surfaces.