bends the arms, bringing the lines close to the side of the face in front of the hips, thus avoiding a muscular action, then taking a long breath and allowing the weight to pull the stiff arms out in front of the body and up as high as possible, the entire interior capacity of the chest will be enlarged, the muscles around the abdomen will be made flexible, and the walls of the thorax will be allowed free play. This movement is called a passive stretch exercise, and is valuable in lifting up the sternum, or breast bone, and rounding out the chest. It does its work almost as well as special apparatus made for the same purpose, such as the sternum elevator, quarter circle, and concave sternum machine.

A special apparatus known as the shoulder lift, and which is entirely and only for the correction of low and stooping shoulders, is a massive and useful machine. It adorns the Harvard and Boston Athletic Club gymnasiums, but is not in use elsewhere in or about Boston, probably because of its size and its cost, and for the reason that less cumbersome, less costly and simpler apparatus serves the same purpose as well, though it surely does not look as if it combined action so much as does the shoulder lift. The apparatus stands about nine feet high, and occupies a space about four feet long and four feet wide on the floor. The base of the apparatus is of wood and is put together like a box. It is about four feet wide each way and about two feet high. A space about three feet long by two feet wide is left in the center of the base, being open from the front of the apparatus. Four steel hollow rods about six feet long and two inches in diameter run from each corner of this lower box to a box of about the same dimensions as this lower box. It resembles a canopy, and is of wood. From the center of the canopy two steel rods extend, on the ends of which are two concave padded blocks, cut for the shoulders to fit into. The operator puts his shoulders under these blocks while standing in the open space in the box below and lifts up on these blocks only with his shoulders, thus lifting weights below in the hollow boxes on each side of him, which are connected with the top of the steel rods at the end of the padded blocks by means of wires running from the weights to the top of the machine through the hollow tubes supporting the canopy above. Constant use of this machine in this way will build up the shoulders and strengthen the muscles around the shoulder blades, particularly the upper trapezius.

Another machine, much simpler, yet just as useful, if not more useful, than the shoulder lift, is the sculling machine, which any one can make out of a common pulley weight machine by joining the two lines of the pulley weight machine together, running them over one pulley block, connecting them with the end of a round pole about six feet in length and two inches in diameter, and attaching the other end of the pole to the floor by means of a staple, so that the pole will have free play of about one inch at the floor end. The machine is then as complete as the so-called sculling machine, which has but one pulley line running from the weights over a single pulley at the height of about five feet from the floor, the line being attached to the pole at the top, and the bottom of which is stapled to the floor about one foot from the weights. The line running over the pulley is left long enough to give about three feet play to the top of the stick without lifting the weights. The operator, standing in front of this stick, facing the weights, catches the stick at the top close to the upper end, and swerves it with both hands, first to the right and then to the left, moving it in the same manner as he would move an oar in sculling a Whitehall boat, and getting as much resistance from the weights he is obliged to draw up at every motion to the right or left of him as he would get from the resistance given his oar by the water. The person who uses this machine will find it a special developer for the muscles of the sides, back and loins, and as much of a general developer as is sculling a boat. The paddling machine found in most gymnasiums is made in much the same manner as the sculling machine, and it certainly is just as useful, for the reason that, besides being a general developer, it is a special developer of the muscles of the back and sides, and also the triceps and biceps of both arms. This paddling machine is nothing less than a pole and a pulley weight machine. The pole is attached to the end of the pulley rope, close to the floor, and the rope runs through a shifting pulley block attached to the lower part of the pulley weight box or slides. The operator catches the end of the pole farthest from the weights while standing about six feet in front of the machine, and he moves the lower end of the pole with pulley attachment to the right and to the left, in front and behind him, with the same motions he would employ if standing up in a boat and paddling along with a single blade oar, the lower end of the pole being the blade. As the operator moves the stick out from the pulley weights the weights are pulled up in the slide or box, they being the resistance offered that gives the motion a realistic feeling.

The sculling and paddling machines are only two of the many such devices employed in the gymnasium for body building and exercise purposes that are as fascinating as they are ingenious.

(To be continued.)

ARE THERE OTHER SPEECH CENTERS BESIDES THE ONE OF BROCA?

By Z. H. EVANS, M. D., Bay City, Mich.

I WAS called April 21, 1888, to see Mr. K., aged twenty-four, a contractor by occupation. Upon my arrival at the house, I learned from the members of the family that two weeks previous to my visit, while engaged in removing a swing bridge, he had fallen about thirty feet, striking on the left side of his head and shoulder, rendering him insensible. In this condition he was removed to the Northwestern Hospital, where he remained unconscious for some forty-eight hours. The surgeons in charge regarded the case as a simple shock, and treated it accordingly. At the expiration of two weeks he had so far recovered as to be removed to his own home, a distance of only a few blocks. When I first saw the patient, his general attitude was that of Fig. 1. Examination of the head revealed a slight depression over the upper and middle portion of the left parietal bone—the line of fracture extending down toward the temporal. Slight pressure exerted over the depression would cause him to fall to the floor, and at

the same time produce a violent pain in the head which would last for hours. He was also suffering from double vision, which annoyed him exceedingly. His tongue when protruded would turn to the right. His sense of taste was gone, while his sense of smell was stimulated to a high degree. His hearing was not disturbed. Confronted with all the above named symptoms, I at once concluded that it was a suitable case for trephining, and so expressed myself to the family; but knowing there was a possibility of a lawsuit growing out of the accident, I asked the privilege of inviting other sur-

FIG. 1.

geons to see the case, which was granted. Accordingly I invited Dr. Vaughn, Dr. Carron, Dr. Miner, Dr. Landon, and Dr. Elliott.

After giving the patient a thorough examination, they concluded it would be better to wait for a short time and see what nature would accomplish for the patient, as some of the doctors present thought that the lesion was beyond the reach of the trephine. They believed that there was a blood-clot at the base of the brain pressing on the third, fourth, and sixth cranial nerves, thus accounting for the double vision. Others thought, as the depression was slight, the brain would in a short time adjust itself to its new quarters and then cease to cause the patient any further trouble. We waited from April 23 to May 18 for the clot at the base of the brain to absorb and the brain to become reconciled to its new quarters. The patient in the mean time lost his reason, and during the paroxysms would, if left to himself, get out of doors and run in a circle, gradually increasing his speed until he became so exhausted that he would fall down in a spasm, when his attendants would carry him to his room and place him in bed, where he would sleep for some hours. On awakening, his mind would be clear, but he would have no recollection of what had taken place. On May 18 I again urged upon the family the importance of elevating the depressed bone, and gave my unqualified opinion that his mental and physical condition was wholly due to the

FIG. 2.

skull pressing upon the brain, and if operated upon would improve just in proportion as the brain was relieved of its pressure and no more. The family finally accepted my views of the case, and with the assistance of Dr. Miner, Dr. Carron, Dr. Vaughn, and others, we began the operation by first shaving that portion of the head that was likely to be involved in the operation. A crucial incision was then made over the depression

and the flaps turned well back out of the way. The trephine was then placed a little to one side of the depression (marked O in Fig. 2), and a button removed without difficulty. The dura presented a dark, thickened appearance, due to recent inflammation. With the aid of the elevator the bone was raised to its normal position, the flaps were then placed over the wound, a few sutures inserted, and a light compress and bandage applied, which constituted the entire dressing. The patient, on recovering from the effects of the chloroform, expressed himself as feeling quite free from pain, the double vision was gone, the sense of taste was restored, and the sense of smell corrected. He remained in bed for three days, when he got up and dressed himself, declaring that he was feeling quite as well as before the accident. He remained in this condition until about the 20th of July, at which time he began to complain of pain over the left side of the head, which gradually increased until July 25, when he called at my office to consult me in regard to it. As he was constipated, I prescribed ten grains of calomel to be taken at bed time, and asked him to report to me at my office the next day in case he was feeling no better. On his way home, as he neared his house, he tried to call his dog, and for the first time he was made aware that his speech had gone, and also his sense of feeling. I was at once sent for, and on my arrival at the house found the patient sitting on the front stoop smoking a cigar and reading the evening paper. On asking him the cause of my being called, he wrote on a piece of paper stating that he could not speak nor could he feel, and at once convinced me of that fact by placing the lighted end of his cigar to his hands and face. After a little further investigation I became convinced that he was without feeling from the crown of his head to the soles of his feet. He remained in this condition from July 25 to October 6 (making in all seventy-five days), when a consultation of several physicians was called, and after giving the patient a thorough examination, there were as many different shades of opinion expressed as to the lesion involved as there were surgeons present. After communicating the views of the surgeons to the patient, I then asked him what I should do. He wrote on a piece of paper: "Operate; I am a winner, let the result be as it may." The next day, October 7, with the assistance of Dr. Miner, Dr. Baker, Dr. Vaughn, and others, we again proceeded to the operation. After shaving the head it could be plainly seen that there was a slight depression of the size of a five cent piece at the middle and lower portion of the left parietal bone. Slight pressure over this painful spot would cause the patient to wince and cry out with pain, which fact convinced me that there was either pus or a tumor in the immediate proximity of the depression. The trephine was then placed directly over this tender portion and a button removed—not, however, without some difficulty, as the upper portion of the skull was very thin while the lower border was quite thick, which caused the dura to be opened to quite an extent. There escaped a few drops of greenish fluid, the product of inflammation. The brain now pouted forward into the trephine hole in the skull.

After a brief consultation with the surgeons present we concluded, as there was evidence of pus being deeply seated in the brain, to leave the wound open for future exploration. A light compress and bandage were then applied, one fourth of a grain of morphine injected, and the patient placed in bed, where he slept for some hours. On awakening, he was delighted at the change that had been wrought. His speech was restored, the sensory disturbance corrected, and he expressed himself as feeling quite like his former self. He continued to remain in this condition for six days, when his speech gradually became a little thickened, and he

FIG. 3.

found it a difficult matter to express himself intelligently, the tendency being to use the wrong word. On examination of the wound, the brain was found pouting still further forward, completely filling up the trephine opening in the skull. From this fact I became convinced that there was pus forcing the brain forward. I then took a slender bladed knife and passed it into the brain to the depth of an inch or more, when a dark,

bloody pus commenced to flow and run down the side of the patient's neck. A pair of small issue forceps was then passed, with the blades closed, into the wound and the blades allowed to open, which enlarged the opening sufficiently to admit of its being washed out, which was done with lukewarm water. A few strands of oakum were then inserted into the wound for the purpose of securing free drainage. The flaps were then placed over the wound and maintained in position by means of a compress and bandage. Morphine was ordered to be given in case there was pain. On calling in the evening, much to my surprise I found the patient up, dressed, and conversing as well as before the accident.

The result obtained convinces me that there are other speech centers besides the one located by Broca in the third left frontal convolution. If there are not other speech centers besides the one of Broca, I should like to know why it is that this patient's speech was restored by trephining and evacuating pus over the region indicated in Fig. 2. While I am aware that it takes more than one case to establish a surgical truth, I am fully convinced that there are two forms of speech located over the region trephined, as before the operation the patient was unable to utter a loud sound, but could converse by writing. Since the operation he can talk, but is unable to write even his own name. In his own language, he says he has forgotten how to form the letters.—*N. Y. Med. Jour.*

GEN. BOULANGER.

THE election, on Sunday, January 24, of Gen. Boulanger as member of the French Chamber of Deputies for the Department of the Seine, by a majority of the whole constituency, and by a very large majority over

previously to his being patronized by M. Clemenceau, the leader of the Democratic party some four years ago, as an officer disposed to undertake the task of working out certain measures for the stricter enforcement of the conscription. The jealousy of the laboring classes of the population, with regard to the legal exemptions and indulgences in this respect allowed to the educated and professional and well-to-do middle classes, with the permission to avoid military service by payments of money, afforded M. Boulanger some ground for taking credit with the Democratic party as the agent of a more uncompromising new system. This has been his principal achievement. As a junior officer, he fought like hundreds of others in the German war, and gained a moderate degree of professional distinction. He obtained the command of a corps of occupation in Tunis, where he was mixed up in quarrels with M. Cambon, the French Consul-General, and in certain scandals connected with an intrigue to procure the Grand Cross of the Legion of Honor for a money lender who was an ally of M. Clemenceau. He afterward held, for two years, the War Office directorship of business relating to the infantry of the line, and effected some changes of detail conducive to the comfort of the common soldiers.

Toward the end of 1885 he was appointed Minister of War by M. Freycinet, and became a political personage. His attitude, as a member of the opposition party, since the formation of more recent ministries, and his appeals to popular sentiment against their policy; his repeated acts of military insubordination, for which he was deprived of his command and put under arrest; the incident of his denying the authorship of a letter formerly written by him to one of the Orleans princes; his electoral candidature in several provincial departments, with noisy popular meetings,

giving a very precarious majority to the Constitutional Republicans, as the Royalists often join in a factious vote of the Extreme Democrats to embarrass any Republican ministry. This is the real cause of all the difficulties that the short-lived ministries of late years have encountered. The Senate is the most effective political bulwark of the Republic, and its abolition is the avowed object of Gen. Boulanger, as it is of the partisans of the Comte de Paris, styling himself King of France, and of Prince Victor Napoleon, whom some would place on the imperial throne. But a revision or alteration of the Constitution must be preceded by separate resolutions of the Senate and of the Chamber, and must be effected by the two bodies sitting together in Congress or National Assembly. It is more than doubtful whether Gen. Boulanger has sufficient political ability to bring about this consummation. If it were attempted by force, it must be either that of a mob insurrection in Paris, which might be crushed as readily as the Commune of 1871 was crushed by the orders of the National Assembly; or it must be that of the army itself. But it is believed that none of the commanding officers of the army, and but a small portion of the soldiery, now drawn from all classes of society, and closely connected with civil interests, would follow Gen. Boulanger, a man of little military renown and no manifest genius, in such an odious and desperate attempt.

These considerations should mitigate the alarm occasioned by the recent election for Paris, that is to say, for the Department of the Seine, which has the enormous register of 468,697 electors on the basis of universal suffrage, enabled by the "scrutin de liste" to vote in one electoral body, instead of being divided, by the "scrutin d'arrondissement," into constituencies of moderate size. The number who actually voted was 435,860, of whom 244,070 voted for Boulanger, 162,520 for Jacques, 16,760 for Boule, and 10,358 for outside candidates. The amount of voting for Boulanger is not unprecedented, Lamartine having got 259,000 votes in 1848, when Paris had scarcely half its present population; and in 1885 the poll for M. Lockroy, son-in-law to Victor Hugo, was considerably greater.

The portrait of Gen. Boulanger is from a photograph by M. Nadar, Rue d'Anjou St. Honore, Paris.—*Illustrated London News.*

[ENGINEERING AND MINING JOURNAL.]

CHARLES STEWART STONE.

By the death, on Friday, the 11th January, 1889, of Professor Stone, of the Cooper Union, in this city, a quiet, faithful, useful life was brought to a close. I cannot justly call this termination premature; for Professor Stone was in his seventy-third year, and had been continually engaged in teaching (principally in chemistry and mineralogy) for nearly half a century. I am not even certain that, if he could have foreseen the end, he would have deemed it a misfortune to die with the harness on, and to miss that period of final repose, the *otium cum dignitate* of old age, to which so many active men look forward, and which the few who attain it so seldom enjoy; for he was, both by temperament and by training, a man who found his regular routine of work not specially burdensome; carried it patiently and comfortably, without intense delight or disgust, and would have been unhappy without it. I fancy that in all such lives of loyal, uncomplaining discharge of duty, in which ambition seems to have disappeared, and conscience itself has become habit, we may find, if we look further, the real sustaining and refreshing element in some occupation of which the public or the employer sees little—domestic pleasure; the passive enjoyment of literature; the practice of some accomplishment; or the pursuit of some favorite object, which atones for the relative monotony of daily employment. If such persons are simply appreciative, not aggressive and self-asserting, they receive less credit than is due, either to their usefulness or to their achievements. It may be unjust to the subject of this sketch to say that he was one of that class; but such was certainly my earliest impression of him; and such it remains, after more than thirty years.

Professor Stone was born in Maine, in 1815; graduated at Yale in 1842; immediately began his career as a teacher, and was thus engaged at various schools in Maryland and Pennsylvania until 1847, when he became for four years principal of the Trenton Academy, at Trenton, N. J. Removing thence to Brooklyn, he opened there a private school, which he conducted until he became, in 1856, professor of natural sciences in the Brooklyn Collegiate and Polytechnic Institute. This position he retained until 1863, when he was appointed professor of chemistry and geology in the Cooper Union—a position which he held more than twenty-five years.

It was at the Brooklyn Polytechnic that I knew him first, and I can well remember that, although a relatively young man, he impressed the boys as old. To my eyes, he never grew any older, but remained always the same steady, patient, unenthusiastic, industrious incarnation of duty. He was not one of those teachers who fascinate and inspire the *indifferent* pupil. If a boy really wanted to learn, Professor Stone was glad to help him; if not, the professor did not worry about it. He was a good demonstrator in experimental physics and chemistry, and his explanations were clear and simple. If any student wanted more, he could have it for the asking; but it would not be forced upon him.

But whoever would get behind this mask, and find the living man, had only to exhibit a real or feigned interest in the professor's collection of minerals. This was his pride and joy. He loved it as a gardener loves his flowers; and through it one might go straight to his heart.

For such a temperament, a sphere much more appropriate than the Polytechnic was presented by the Cooper Union. In the former school, he encountered boys not wildly desirous of learning anything in particular, or (if they had passed that stage of immaturity, and begun, as the saying is, to "wake up") enthusiastic in some other department of study, where emulation, fed by "sums" and problems, furnished more excitement. But in the Cooper Union, that wonderful great college of which New Yorkers boast so much and know so little, there are no careless pupils, sent by their parents and anxious only for marbles at "recess." I know of no other place where thousands of students

GENERAL BOULANGER.

his principal competitor, M. Jacques, but with the assistance of votes, estimated at 90,000, given by persons hostile to the Republican form of government, is a rather startling event; but its importance may prove much less than has been imagined. Though it may occasion the overthrow of a ministry, giving to the general, by the peaceful instrumentality of the ballot box, his revenge on M. Floquet for the wound inflicted in a sword duel not many months ago, the predictions that it will destroy the Republic, and will substitute the rule of a military dictator, or a royalist reaction, are not worthy of much consideration. The wish is father to the thought; and the exultation is premature. Gen. Boulanger, if he had the unscrupulous ambition to seize power like a Napoleon, of which we do not accuse this self-asserting demagogue, has apparently neither the ability nor the reputation, nor is likely to have the opportunity, that would enable him to play such a part. A third-rate general, who has never commanded an army in any notable campaign; an administrative official in the War Department, and for less than two years Minister of War, but only in time of peace; a political agitator who is no orator, who has no affluence of ideas, no skill in debate, and whose individual behavior has been remarkably indiscreet, placing him in various undignified situations—is not the man, with his plebeian name and inglorious associations, to be made the hero of the French nation.

He is merely the tool of factious entertaining different and opposite designs, seeking a chance to profit by renewed political disorder, and intending to throw him overboard at the moment when they shall have gained a temporary advantage in the confusion which they hope to produce. If contemporary history supplied the account of any great action, military or civil, performed by M. Boulanger, who is now about forty-five years of age, it should find place here in a biographical memoir; but the record of his public life is barren and obscure

banquets, and street parades, demonstrating hostility to the government and to the constitution—have not been calculated to strengthen confidence in his loyalty to the Republic or in his possessing the virtues of citizenship. Among genuine Republicans there is now a complete distrust of his professions of adherence to that form of government which has existed for the past eighteen years.

Gen. Boulanger's scheme for the revision of the constitution is to abolish the power of the presidency and to do away with the Senate, which are the two features most resembling those of the United States republic, and from which its stability, and the energy and consistency of its executive government, are derived. The President of the French Republic, with functions like those of a constitutional sovereign, but obliged to accept ministers supported by the majority of the Chamber of Deputies, is elected, by the members of the Senate and Chamber voting together, in the National Assembly, for a period of seven years. M. Carnot, who succeeded M. Grevy in December, 1887, will be President till December, 1894, and will, under the advice of ministers responsible to the chamber, see that the laws are enforced, controlling the whole civil administration and disposing of the army; but he cannot declare war, or ratify foreign treaties, without the express assent of the Legislature. The Senate, consisting of three hundred members elected for nine years, not all at once, but one-third of them to be elected in every third year, represents the Councils-General of the departments (similar to our new County Councils), and the Municipal Councils of communes, these being elected by universal suffrage. It shares the legislative power with the Chamber of Deputies, and is peculiarly the guardian of the constitution. In the present Senate there are 230 Republicans to seventy Monarchists, whereas the present chamber contains 170 Royalists, 220 Moderate Republicans, 170 Radicals, and 30 Socialists,