Pedagogical Laboratories

How Children are Studied in a Russian Laboratory from Their Birth Until Their Twenty-first Year

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[TODAY nobody will deny that anatomical rooms and physiological laboratories are the foundations of the science and art of medicine; that physical laboratories are the basis of civil and electrical engineering; that psychological laboratories and the psychological clinics are the cornerstones of the science of the human and animal mind. But we are only beginning to see how education is developing on the basis of the accurately determined methods and carefully established principles of experimental pedagogy. Indeed, to-day every sane educator feels a crying need for the scientific investigation of the whole field of educational problems. In this article a pupil of Prof. Meumann's explains how this need for scientific investigation is being met.—EDITOR.]

In order to place education on a sound scientific basis we need: (1) *Pedagogical laboratories*, which ought to be the real sancta of all true educators who would know the pedagogical truth and understand the real workings of the normal mind of school children and the nature and the postulates of school educational reforms; (2) *Pedagogical clinics*, the function of which should be to discover and cause to be remedied, as far as possible, physical defects and communicable diseases that might interfere with efficient school work of pupils; (3) *Experimental schools*, the purpose of which is (a) to find out by experiment *whether*, *how*, and *where* the school educational problems may be worked out, and (b) to save time, money, and energy of other people in performing similar elaborate experiments which, of course, require most favorable conditions, especially unhampered work with all the needed resources at hand, in order that results may be reached, both freely and securely, and not by mere subjective discussion and one-sided theorizing.

We have no real, scientific experimental schools and pedagogical clinics. The few attempts made in this direction were quasi-scientific undertakings of private individuals (Dewey, Reddie, Lietz, Frey, Tolstoy, Venzel, Ferrero, Montessori, etc.), who were willing to reform the present school education, but had no necessary means for such a big task. We have only a few pedagogical and psychological laboratories plus their outgrowths as scientific pedagogical periodicals, series of monographs, associations, societies, clubs, congresses, institutes and academic lectures. Germany leads in this field. She has about thirty scientific pedagogical periodicals dealing with the problems of experimental pedagogy, about ten different series of scientific pedagogical mono-

A corner in the Zürich laboratory showing models used in teaching anatomy and physiology of child's central and sensory nervous system.

Apparatus of Zürich laboratory for studying pupil's association and reaction.

Apparatus of Zürich laboratory for studying pupil's memory, perception, emotional phenomena, etc.

graphs, about 30 associations for the study of school children, etc. Next to Germany comes Switzerland, then Belgium, Holland, France, Russia, Italy, Sweden, Austro-Hungary. The majority of German and other European and American psychological institutions are more or less engaged in some pedagogical investigations with special reference to the psychological basis of it.

The first laboratory which devoted its energy to real pedagogical experiments is Meumann's Laboratory in Zürich. Meumann's residence in Zürich (1897 to 1905) signaled the birth of experimental pedagogy. His laboratory soon became the main station of scientific pedagogical research, a Mecca for many foreign students who wanted to get pedagogical facts and were willing to labor in order to observe the real educational conditions. Later he founded similar laboratories in Königsberg (1906), Münster (1907), Halle (1909), and Leipzig (1910). In Hamburg he has his latest laboratory, and in that city he is organizing the first *International Institute for the Study of School Children*. It is a hopeful day for education that a man like Prof. Meumann, himself a master in experimental psychology and philosophy, turned to the practical problems of pupil's development and school instruction. He combines in a very happy and unusual way the different qualifications of a good observer of children and pupils. He has the very first conditions for success (1) a loving interest and the clear sympathetic insight which grows out of this, and (2) he never allows his sentiment to get the better of him, looking at the child from an impartial and unbiased pedagogical point of view. His laboratories were, therefore, always filled with earnest students of all nationalities (Messmer, Ebert, Magneff, Zoneff, Smith, Pentschew, Winteler, Ziegler, Engelsperger, Abramoff, Mayer, Schmidt, Pfeiffer, Eckhardt, Karrenberg, Albion, Goddard, Starbuck, Hoesch-Ernst, Borst-Diirr, Kelchner, Segal, Gineff, Rakitsch, Chubrovich, etc.), and his lectures were attended by as many as one thousand students.

Meumann's laboratories and institutes (1) collect anthropometric and psychophysical data for the purpose of establishing norms and for ascertaining such relationships as may be of service to school education; (2) apply precise psychological apparatus and instruments, and accurate scientific methods to scientific school educational problems, particularly methods of hygiene teaching and economy and technique of learning; (3) examine school children individually and collectively with a view to advising as to their school

Apparatus of Zürich laboratory for studying arm-movements in children.

Apparatus of Zürich laboratory for studying child's reading and visual perception.

educational management, and (4) give practical and theoretical instruction in experimental pedagogy.

Pedagogical investigations are carried out also in many psychological laboratories and institutes.

Another type of pedagogical laboratory is remarkable and is the first of its kind in the world. It is the *Psycho-Pedological Institute* in St. Petersburg. This institute was founded in 1909, by the generous gift of a great Russian philanthropist (V. T. Simin), who gave to the institute a beautiful "Internat for the Study of Man as a Subject of Education," and also 52,000 rubles. The director of this institution is the famous Russian biologist, V. M. Bechtereff, president of the Psycho-Neurological Institute (opened on February 3rd, 1908), founder of the first Criminological Institute of Russia (St. Petersburg, 1908), and one of the greatest scientists in Russia. The plan of the psycho-pedological institution is to provide for 10 to 15 beds to study the mentality of human beings as subjects of education. Each subject is studied and educated from birth up to 21 years of age. The first child who entered this institute was a baby boy, named Seryoja Parinkin, who is under constant care and observation of two physicians (Drs. K. E. Livshchich and T. P. Spirtoff), and three nurses.

The programme of the studies of these babies is too long to present here. We may mention, however, that it includes not only the problems of the present, but also those of the past of the child, i. e., his hereditary traits and his prenatal life. Here they study carefully the child's organism with all its function, and the dependence of the organs upon environment. The child's temperature is noted every day as well as its pulse, its breathing, and its nourishment. From time to time the child's weight, body proportions, teething and various discomforts (injuries, sickness, etc.) are recorded. The whole development of the sense organs is studied. All these observations will give the most precious practical conclusions in regard to the first days of a child's psycho-physical life, the first steps of his bodily growth, which is closely connected with the mental growth. In addition to that a series of very interesting scientific and practical questions are studied, viz., habit formation in children, natural (native) and artificial (due to exercise only) movements, the child's relation to conscious and unconscious objects, his relation to his new acquaintances and friends, his fears, etc.

Such an objective, patient and constant individual study will be of immense value to pedagogy, physiology and psychology of the child. The St. Petersburg institution should be a great aid toward making good pupils and good teachers. Logically, it does seem that we must know by experiment, before we can teach, or before we can show others how to teach school children. Curiously enough, we have thousands of normal schools, but are just beginning to talk about the need of the kind of school that should precede the normal school. Still we ought to be content that the old school method, founded upon a rigid faith in the book and traditional processes, is losing its ground almost daily.

The Other Side of War

BY this caption Dr. E. Helme, writing in *Le Temps*, means to indicate the rougher side with which those individuals come into painful contact who feel within their own skins the effects of modern weapons. To the question: Will war be more murderous in the future? this expert answers with an unhesitating affirmative. Wars, it is true, instead of lasting a hundred, thirty, or seven years, as in bygone days, now last only a few months. But this, he says, simply means that the blows are heavier, and the combatants are sooner exhausted. The Russo-Japanese war lasted only eighteen months, but the battle of Sha Ho, in Manchuria, lasted twelve days. Thus, although the number of killed and wounded per day in the actual fighting of the Franco-German war may have been greater, the losses in battle in the Manchurian campaign were much greater in the aggregate. The truly terrible fact, however, is the increasing proportion of mortal to non-mortal wounds: In the Franco-German war of 1870-71, the victorious army lost ten men killed to every 58 wounded; in 1904-05 there were ten Japanese killed to every 37 wounded.

Coming to the explanation of these facts, Dr. Helme dismisses as "a troublesome legend" the story that modern bullets, being smaller and moving more rapidly, inflict less serious wounds. Really slight wounds, he maintains, heal more quickly and more thoroughly nowadays than formerly; but the severe wounds are no less severe and much more frequent. To illustrate this the writer considers, first, the form and structure of projectiles and then their motions. "The lance *well handled* inflicts severe abdominal wounds," and the Japanese cut-and-thrust bayonet "is terrible," but the writer's main theme is the effect of projectiles.

First comes the rifle bullet, "but yesterday the Queen Murderess of Battles." The German bullet consists of a core of lead hardened with antimony, covered with

a steel jacket. It is none the less efficacious because the jacket often comes off and acts on its own account as a jagged fragment of metal, lacerating the human body. The French bullet, though not jacketed, is no kinder to the enemy. It is longer and sharper-pointed than the German, and is made of a mixture of copper and zinc. Becoming bent by ricocheting, it sometimes enters its victim's body in the shape of a hook; sometimes it "tumbles" in its flight, enters broadside-on, and makes a long, gaping wound. Up to a range of 800 meters these rival horrors are one as bad as the other.

The gravity of the wounds depends on a multitude of conditions. On the rocks of San Juan, where the bullets ricocheted in wonderful fashion, the American surgeons reported frightful injuries. It was the same

Prof. Wladimir Michailovich de Bechtereff.

He was born in 1857 in Wiatka (Russia) and is one of the greatest living Russian scientists, whose works are published in Russian, German, French, and Bohemian.

at Spion Kop, in the Transvaal. It used to be said, optimistically, that a bullet heated by friction in the barrel of the rifle would reach its object aseptically by friction; but this hope has been dispelled by the researches of von Koler, showing that the temperature of the projectile never comes within many degrees of that which is necessary for the destruction of microbes. The cruelty of the modern bullet has been augmented, too, with the increase of its rotation, so that it acts not only as a club, striking a heavy blow, and a perforating point, but also as a gimlet which lacerates the tissues.

But bullets, after all, are mild agents of destruction when compared with up-to-date shells. The shell wounds in the war of 1870 were only 91 per thousand; in the Manchurian campaign they were 176 per thousand; in the Balkan war of 1912 they were four times

Some anthropological instruments which are used in a pedagogical laboratory.

as numerous as in 1870. The shrapnel shell has the advantage (to its employer) of scattering destruction by means of some hundreds of small round bullets as well as the fragments of the shell itself. This "devil's watering-pot," as the Russian soldiers called it, works best within a radius of 10 to 30 meters; at 100 meters its "dewdrops" are still lively enough to penetrate 6 centimeters of pine board; at 300 meters a turban will protect the head from their effects. The tortuous incisions made by shrapnel are particularly difficult to disinfect. But in spite of all this, and though the ear of the most hardened veteran is said never to become accustomed to the death-song of shrapnel overhead, the common shell is really more terrible. Its fragments, brought to a very high temperature by the explosion, "burn the flesh so as to compel cries of agony

which only morphine can quiet." Lastly, the large shells of the naval guns "not only cut like razors, but asphyxiate, amputate portions of the body and crush."

Dr. Helme's study of the movement of projectiles and its effects at various ranges, and on various tissues, should be minutely interesting to those who love "the pomp and circumstance of glorious war." Its effects on bones, in particular, are classified as: (1) explosive; (2) comminutive; (3) contusive. The first, resulting when the range is not greater than 500 meters, splinters the bone so thoroughly as to explain the frequent accusations of using explosive bullets which have become a feature of modern war news. The second, proper to the zone of from 500 to 1,200 meters, is distinguished by the danger of bringing with it fragments of soiled clothing, carrying gangrene. These effects are observed only in the main body of the bone; in the spongy extremities there is less harm done, except when the extravasation of blood brings on a diseased condition of the joint.

The effects of projectiles on soft tissues and organs containing liquids has led students of the subject to some highly interesting experiments. A bullet fired at an empty metal vessel makes a small hole both entering and leaving. But a bullet fired at the same kind of vessel filled with water, while it enters through a small hole, as before, leaves through a jagged opening 12 centimeters wide. This very fairly illustrates the effects of a bullet upon, say, a human stomach. The explanation advanced by the experimenter is: "In its passage, the bullet carries with it molecules, which are of very small mass, but move with great rapidity; these, being projected in all directions, have the effect of compressing the inert molecules (of the surrounding medium) and an outburst of the wall of the vessel follows at the egress of the projectile." And so it is that bullet wounds in the stomach, bladder, liver, intestines and head, received at short range, produce veritable explosions of these parts.

The writer concludes his discussion with the consolation, such as it is, that science and humanity appear in a much better light when we consider their achievements for the benefit of the good men who are wounded in their country's service.

A New Wright Hydro-aeroplane

A NEW type of Wright hydro-aeroplane has been designed by Wilbur Wright. In the tests which have been conducted on the Miami River, near Dayton, O. Mr. Wright has already made more than a hundred successful flights. This new machine, which is known as the Wright Model CH, is remarkable for the ease with which it starts and alights. The planes, rudder, motor and drive follow the standard Model C lines. The span is 38 feet, chord 6 feet and the surface area about 440 square feet. The weight empty is 1,160 pounds, including the main float, which alone weighs 240 pounds. The hydroplane unit consists of a single float 6 feet wide, 10 feet long and 10 inches deep, besides a small pontoon which supports the tail. The machine is equipped with a new Wright six-cylinder, 60 horse-power motor, which drives two 8½-foot propellers.

One Starter in the English Coast Flight

THE London *Daily Mail's* \$25,000 contest for the circuit of the British coast with an all British hydro-aeroplane, was started on August 16th from Southampton with only one participant, Harry G. Hawker, the winner of the Michelin prize in 1912. Hawker carried a passenger, and made his first landing at Ramsgate, a distance of 144 miles from the starting point, which was covered in 143 minutes. His machine is a biplane equipped with a 100 horse-power motor and with a tractor propeller. The only other entrant remaining on the list of contestants is Frank McClean, who did not reach the starting point in time to begin the flight with Hawker, but who was expected to enter the contest later in the week.

The Retirement of Commissioner Moore

EDWARD B. MOORE, retired from the Patent Office on August 15th, after a service as assistant commissioner and commissioner extending over twelve years, and following service on the examining corp of about eighteen years. Mr. Moore has entered upon the practice of patent law, becoming a member of the firm of Moore & Clark with offices in Washington, D. C., and New York city.

Cleaning Boiler Gages

A GOOD way to clean the deposits or stains from the glass gages on steam boilers is to remove and soak them in the following solution: Water, six ounces; salt, 1 ounce; acetic acid, 1 ounce. After the glass is thoroughly moistened place some baking soda inside and place back in the solution. A gas is evolved that removes the iron or calcium stains in the tube. The solution is harmless to the hands. A cloth drawn through the tube dries it and cleanses remaining spots.