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RECOLLECTIONS OF A STREET CORNER PUMP AND THE PROGRESS OF SIXTY YEARS[1]

By Professor YANDELL HENDERSON

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THESE recollections center about an old pump on a street corner and some of the boys who used it: particularly one of the boys, Simon Flexner by name. The pump was on the southeast corner of Chestnut and Sixth Streets; the time was about sixty years ago, when I was nine or ten years old, and Simon Flexner just ten years older. Any city of our Midwest or South would do as well; but in fact the place was Louisville, Kentucky. This pump was merely the trunk of a tree—virtually a piece of telegraph pole with its center bored out—stood up in a well. A long curved metal arm with a knob on the end stuck out to the side and was worked up and down, first merely sucking air and then causing a flow of clear, cool and rather pleasant-tasting water. Hanging by a chain was a large metal dipper; it was so green with mold that in drinking from it I preferred to apply my lips to the edge close to the long handle. We children liked the pump and the water and the dipper, for in warm weather we could not only drink copiously but also dabble our bare feet in the splash and stream as the water ran off into the gutter or drained back into the well. There is no analysis of this water on record; nor were any bacterial cultures ever made from the dipper. But the following will give an idea of what might have been found if such an examination had been made and what Simon Flexner survived—for the good of humanity.

[1] This sketch is written as a testimonial to Dr. Simon Flexner, emeritus director of the Rockefeller Institute for Medical Research, on the occasion of his eightieth birthday.

The well below the pump was perhaps fifteen or twenty feet deep. The street was paved merely with a porous water-bound macadam, and there was no sewer, but only surface drainage. Any liquid in the gutter must in part have soaked into the subsoil and so have found its way into the well. But more important is the fact that not a hundred feet away from the well, in the backyard of the second building from the corner, was a cesspool. It was walled with brick and lime mortar, and as it was in constant use by a considerable number of people, it is as certain as the results of similar conditions elsewhere can make it that an appreciable seepage from the cesspool to the well went on continually.

Even this is not the full indictment of that pump and its dipper from which we drank the cool, pleasant-tasting water. The building on the street corner was an apothecary's shop, a "drug store" where the apprentice and clerk, Simon Flexner, sold us children candies, gum drops, licorice and sticks of colored peppermint, when we were well, and dispensed to our parents strong medicines—calomel, quinine and preparations of opium—when we were ill. Over that shop a doctor, one of the leading physicians of the town, had his office. His patients, with all manner of infectious diseases, including diphtheria and smallpox, drank from the pump by means of the common dipper on their way to and from his office. He specialized in skin diseases and was particularly well known for his success in the treatment of syphilis; for he had introduced from Europe and administered in his office the then newest treatment—the patient sat under a little tent of cotton cloth with only his head projecting, while a lamp below the chair vaporized mercury about his naked body. Many a syphilitic sore mouth drank from that dipper.

When the physician finished his office hours and went to dinner, he had merely to step across to his home in the house next door, the house with the above-mentioned cesspool. There were no fly screens then on the windows; but there were plenty of stables where this doctor, among others, kept the horses which drew his "buggy," as a doctor's car was called; and each of these stables had an unprotected pile of horse manure in which flies bred freely. Many of these flies, after picking up typhoid and other germs in appropriate places, flew to the dining room table, where this physician, his wife and four children, and his nephews, of whom I was one, enjoyed the bountiful American food of those days, including many good things no longer in market or too expensive now. Our sanitary protection was a coal-black Negro girl who, during dinner, waved a brush of long peacock feathers over the table so as to keep the flies on the wing and out of our milk and butter.

Speaking of that milk, there is one aspect of our present sanitation which, for me at least, has a drawback. Nearly all children then liked "cottage cheese," and I particularly liked the clabber or sour milk before the whey was drained off. To produce clabber, it was only necessary to set fresh milk over night in an open bowl in the kitchen, where it was warm. The milk was already sufficiently infected with lactic acid bacilli so that nature produced such clabber as the pure milk of nowadays yields only when treated with artificially grown organisms. Well might that milk yield clabber! It was brought from the dairy farm in a large can with a spigot sticking out of the back of the milk wagon and a line of pint and quart measures hanging alongside, which the milkman used again and again, unwashed, to measure off the white and foaming stream in the full exposure of a very dusty street. Out at the dairy farm there was no ice; but there was a fine spring house where the milk was set in large flat pans in the running water for the cream to rise. To skim off this cream, the milkman tilted one of those pans over a smaller vessel and then blew his breath vigorously over the surface, so that the upper layer of cream flowed off—a sort of pneumatic skimming.

All of us children had all the common diseases of childhood at an early age and several diseases that are not now common. I had typhoid at the age of six. On summer evenings our parents sat on the front doorsteps, chatted with their friends and drank lemonade or mint juleps, of which we children afterward got the sugary leaves, moist with good Bourbon whiskey, to suck. Until we were put to bed under mosquito bars we were busy slapping the anophèles mosquitoes which bred luxuriantly in numerous ponds in vacant lots within the city limits.

Whenever we seemed at all unwell, we received immediately ten grains of quinine with calomel in powder form on the point of a knife. Some of the older people had lost their teeth from being salivated with excessive calomel: this was so common that we children used the word "salivate" as a slang synonym for administering a crushing defeat: thus it would be said of a fight in which Bill thrashed Jack that "Bill hit so hard that he simply salivated Jack." We did a good deal of fighting in those days: the war was recent, and sentiment in Kentucky was pretty evenly divided. Yellow fever did not reach us; but it was feared, for it had one summer come as near as Memphis, Tenn. Smallpox was common, especially among the Negroes, but we were protected by vaccination. For this purpose, on a day in the first year of my life, my uncle, the afore-mentioned doctor, scratched three large areas on my left arm, as evidenced by three large scars which I still bear. To these areas was applied

the pus from the arm of another person; and the "takes" were so successful that my first contribution to preventive medicine came from these sores, for a dozen other persons were vaccinated from them. The calf was not the only source of vaccine in those days, although the material from such human cultures sometimes carried other organisms than those of the cowpox. Long afterward Dr. Flexner himself told me that probably at that time no "calf vaccine" was available: but the crust or scab above a healed vaccination pustule, usually wrapped in a piece of white paper, was carried in the vest pocket of the doctor.

Pulmonary tuberculosis was common and the frequency of other forms of tuberculosis was attested by the number of humpbacks that we saw on the street. Of other diseases, diphtheria was most feared and some of my earliest friends died of it. Twice I had deep, penetrating and non-bleeding wounds, once from a thorn in my foot and again from a rusty nail in the oat bin in the stable. I escaped; but one of my friends, who tore his hand on a barbed wire fence when I was ten or twelve years old, died of lockjaw. Nothing was or could be done for him; there was no antitoxin then. Indeed, we who survived must have borne charmed lives, for I carried up to middle life a pair of tonsils bad enough to have been the cause of acute rheumatism or heart disease at any time during forty years. The tops might have been snipped off; but enucleation was then not done. Asthma and hay fever went untreated. For a siege of boils on my feet, my uncle, the doctor who had the office over the "drug store" (a very good doctor too for those days), prescribed a tonic containing iron. A similar outbreak on the same feet many years later was treated with much more rapid success by omitting the tonic and merely disinfecting the shoes with formaldehyde vapor. (Long afterward I published that mode of treatment.)

In spite of all this and much more, we were far better off than our ancestors only a generation or two earlier: when we had a fever, we were not bled, and could drink all the water we wanted. Also surgical operations, although not as yet aseptic, were done under anesthesia—chloroform poured liberally on a towel.

Perhaps the reader suspects that the people who drank from that pump, and whose sanitary ignorance it symbolized, were an unusually backward and ignorant group. To prove that this was not the case, let me describe two families in the neighborhood. The oldest member of one of them, my grandfather, had been the dean of the first medical school west of the Allegheny Mountains and a friend of the great MacDowell. He was also a geologist of distinction, a writer on medical subjects whose works were highly prized and a physician who was so much in advance of his time that he gave as small doses of as few drugs as his patients would permit. One of his sons was the physician over the drug store. Another was a leading surgeon in the southwestern states and had been the chief medical officer of the Confederate Army operating in Tennessee and surgeon on the staff of General Albert Sidney Johnston. In fact, it was a family of distinguished medical men.

The other family had not been so long settled in the country, but they were already respected for intelligence and scholarship. The father had been born at Prague in Bohemia, and had taught school in the university city of Strassburg before emigrating to America. At the time here referred to, he and his wife, who was born on the Rhine, and their nine children were settled in Louisville on the Ohio, and one of the sons was the apprentice in the drug store. Another of the sons, Abraham Flexner, was sometimes about the store out of school hours and also drank from the corner pump.

Sixty and odd years have passed. Starting, as it were, from that pump on the corner and the drugs on the shelves in the shop back of it, Simon Flexner advanced to medicine and began his training in the meager two-year course, lacking in nearly everything that now constitutes medical science, in the medical school at Ninth and Chestnut Streets, where two of the professors were my uncles, the physician and the surgeon mentioned above. The school got its first microscope while Simon was there. Then he went to the Johns Hopkins Medical School as student and later was assistant to Dr. William H. Welch, who had recently brought pathology from Germany. Thus Simon Flexner went forward until he became not only an investigator of the first rank, but also director of the vast service of the Rockefeller Institute for Medical Research.

Meanwhile his brother, Abraham Flexner, who likewise as a child must have imbibed enthusiasm for medical progress with the waters from that pump, went through Johns Hopkins College; then, for a time, into teaching at Harvard; then into the investigation of prevalent methods of teaching and particularly medical education; and so, from one step to another, until he became secretary of the General Education Board and wrote the great "Report on Medical Education in the United States and Canada" (Carnegie Foundation, 1910) which wrought such a revolution in medical teaching and investigation as no previous age had ever seen.

Others of the nine Flexner children, who all some-

times drank from that pump, have had distinguished careers—not indeed in medical science, but all notable for scholarly ability, broad humanity and public spirit.

Evidently those who drank the waters of that pump sixty years ago gained from it or from some other source such inspiration as Greek legend supposed that the poets drew from the spring of Arethusa on Parnassus, the fabled mountain of the Muses. And if men with such inspiration have achieved results verging on the marvelous within one generation their achievements should be an inspiration also for those who are to come after them in what is yet to be done. Truly if, as Oliver Wendell Holmes stated at the time when the cool water was flowing from that pump, the "state of medicine is the best index of the grade of a civilization," civilization in the sixty odd years since then has advanced as never before.

Nothing in this advance is more striking than the decrease in the deaths among children. In the time when Simon Flexner and his brothers passed the perils of birth, infancy and childhood, as in all previous centuries, ten or more children per wife or succession of wives worn out with child-bearing were not an unusual number born in a family; but often few, and sometimes none, survived to be grown. Now it is the knowledge of the diseases of childhood won by the men who drank from that pump and others like it that balances the diminished birthrate and that generally assures to us who now are old the survival and affection of our children and grandchildren.

INITIATIVE IN RESEARCH[1]

By Dr. COLIN GARFIELD FINK
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FORTY years ago industrial research laboratories were practically unknown. To-day no industry can exist without a research laboratory. The phenomenal advances in aviation, electric communication, textiles, corrosion-resistant metals, plastics, vehicles of locomotion, paints and pigments, etc., etc. (to mention but a few of the hundreds of new products and processes introduced during these past forty years) would have been well-nigh impossible without the industrial research laboratories with their facilities and highly trained personnel.

And these research laboratories are not confined to this country, although by far the larger majority of them are now in America. But there are many laboratories in Europe, in Canada, in Russia and elsewhere that are of the very highest type and that have made important contributions to science and industry.

It has often been said that there is a very decided difference between American and European research and that American research was largely of the "development" type, whereas European was predominantly fundamental or radical research. During the early years of industrial research in this country the above statement was largely true. But it is no longer true to-day.

To avoid any misunderstanding, since we are going to enlarge upon "fundamental research," the usual interpretation of fundamental or radical research is that devoted to finding entirely new products or entirely new processes radically different from anything that has gone before. For example, we have John W. Hyatt's work on the production of billiard balls out of a plastic in place of elephants' tusks. This is a case of fundamental research, whereas development research would imply how to raise more elephants or how to alter their feed to develop longer and bigger tusks.

Another example is the research of D. MacFarlan Moore on electric lighting. Abandoning the incandescent lamp he devoted his energies to discovering the secret of the firefly's glow. To-day the fluorescent lamp is the outcome of Moore's researches, granting of course that in recent years a host of researchers have contributed to this fluorescent lamp. But here again this latter-day research was largely of the "development" type.

FUNDAMENTAL RESEARCH

Personally, during my forty years of research experience, I have always been interested primarily in *fundamental* research rather than development research. And my advice to the young student who has inclinations toward research is to choose the fundamental type rather than the development type. We grant that "the work is harder, the standards higher and the discipline more rigorous" than in any other phase of scientific or technical occupation. But on the other hand the interest and excitement, the stimulation and satisfaction are greater by far than in any other field of scientific or technical endeavor.

To give you some idea of what we mean by *initiative in research* we shall give you brief accounts of a few of the many researches that have been carried out under our direction.

THE PLATINUM SUBSTITUTE PROBLEM

When Edison made his first incandescent lamps at Menlo Park he used comparatively thick platinum

[1] Lecture delivered at the Stevens Institute of Technology on April 14, 1943.