

THE COLLECTED PROFESSIONAL PAPERS
OF
FRANCIS MARION POTTENGER, Jr. M.D.

Together with a
Brief Personal Memoir
by
Thomas Myron Hotchkiss

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A Personal Memoir
by

Thomas Myron Hotchkiss

Dr. F. M. Pottenger, a native of New Baltimore, Ohio came to Monrovia in September, 1895 with an ailing wife, the former Miss Carrie Burtner of Germantown, Ohio. Here he entered into a partnership with Dr. R.D. Adams for the practice of medicine. After about a year and a half, his wife's health not being improved, the Pottengers returned to Ohio where she passed away in November 1898. Shortly afterward Dr. Pottenger came back to Monrovia and resumed his partnership with Dr. Adams. On August 29, 1900 he married Miss Adelaide Gertrude Babbitt, a native of Keysville, New York and a graduate of the University of Vermont, who at the time was vice-principal and teacher of Latin and Greek in the Monrovia High School which was then at the old Orange Avenue School. The Saturday Afternoon Club, predecessor of the Woman's Club, lists her as a member in its roster for 1898-99. To them three children were born:

Francis Marion, Jr.
Robert Thomas
Adelaide Marie.

Francis Marion Pottenger, Jr. the subject of this memoir, was born in Monrovia on May 29, 1901, three years before his father established the famous Pottenger Sanatorium. Francis began his education in 1907 by entering the first grade at the old Ivy Avenue School where he came under the influence of that beloved teacher who taught many early Monrovia's their ABCs, Miss Laura C. Barnes. I have in my possession a photograph of that class of 32 pupils. Among those in the picture who remained in Monrovia for many years are John Zerell, Ralph Slosson, Mary Moore and, of course, Francis himself.

My acquaintance with Francis began about 1912 as I remember. At that time the Pottenger family was living at the "The Oaks", the home on Primrose avenue that was built by W.N. Monroe, the founder of Monrovia. It was a beautiful house for those days with spacious rooms and with ample grounds. A large fountain stood on the front lawn. The fountain jet descended on a statue of a small boy holding an umbrella and fell into the pool enclosed by walls of cut and fitted granite. At the rear of the house was a commodious barn.

Adjacent to the barn there stood a wooden tower supporting a large steel water tank which formerly supplied the house and grounds with water. Beneath the tower was a walled pit which originally contained equipment for making gas. When the Pottenger family lived at "The Oaks" the gas equipment had been removed and the water tank was no longer in use.

One day Francis conceived the idea of building a roller coaster from the top floor of the barn to the ground and decided that the best source of structural material would be the tower that carried the water tank. How to get the tank down off the tower became the first problem to be solved.

At that time Mrs. Pottenger owned a "Detroit" electric automobile for her personal use. It was a large bulky coupe enclosed with panels of plate glass and was steered and controlled by a long lever rather than a wheel. Francis decided that the best way to get the tank down was to tie a length of rope around it and pull it off the tower using his mother's electric automobile as a source of power. One Saturday afternoon a group of us boys got together with Francis and after several trials we managed to jerk the tank free and down it came with a resounding crash. It's a wonder someone

didn't get hurt but we all survived. To forestall any further forays with her automobile, Mrs. Pottenger took all of us downtown to Werden's Ice Cream Parlor for ice cream sodas.

Francis was a born experimenter and innovator, a trait believed to be inherited from his mother's family. He grew up at a time when what we now call "radio" was in its infancy and many of us boys were experimenting with "wireless" sets. The "wireless bug" never seems to have bitten him as I do not recall that he ever tinkered with this hobby. Rather, he was mechanically inclined and loved to make things with his hands both in wood and metal.

When we were boys "Meccano" sets were all the rage and Francis had a rather elaborate set. With it he made among other things, a working model of a rock crusher such as those that were to be found in the Azusa-Duarte area where the gravel resources of the San Gabriel river were being exploited by the rock companies. He set it up in the foyer of the old Wild Rose School where it was enviously eyed by many of his companions. Later, with the same set he constructed a working model of a bascule bridge complete with motor drive. Both models displayed considerable ingenuity in design and construction and were not slavish copies of models displayed in books.

This interest in things mechanical continued throughout his life. In later years he had a lathe and an assortment of machine tools which he used in making equipment for his research projects. At one time for such a project he had a need for a multiported valve that would divert a fluid stream in five different ways. After selecting one from a manufacturer's catalog he felt that the price was too high and decided to make one himself which he did and it worked to his entire satisfaction. It is interesting to note that on a biographical questionnaire from the Los Angeles County Medical Association he listed under "Hobbies", "Machine Tool Work".

Although Francis continued for several years in the primary grades of Monrovia schools and graduated from Wild Rose in 1915, he also attended the Los Angeles Military Academy, Claremont School for Boys (later called the Webb School) and the Thatcher School for Boys at Ojai. In part, this was due to intermittent periods of poor health. Colds, coughs and fatigue plagued him as a child. Prior to entering college he spent almost three years in bed in order to gain sufficient energy to pursue a college career. Even so, it became necessary to spend two or three months out of every school year in bed to carry out his normal scholastic activities. Later in life he recalled that this period was responsible for a somewhat darkened outlook on life and caused him to wonder why we as a people with our advanced technical knowledge could not prevent our children from suffering through childhood and adolescence as he had done.

I believe that it was at about this period the Francis conceived and carried out a project which kept him outdoors and which also served a useful purpose. Many of the patients at the Sanatorium who were well on their way to recovery were urged to walk into Monrovia Canyon and as their strength returned to gradually increase the length of their walks. To assist the patients in gaging the length of their walks Francis had white stakes made and marked which indicated the distance from the Sanatorium and these he placed along the road and trails at intervals of about 100 feet. They reached as far as Emerson Flat and beyond to the falls and also up the trail into Spanish Canyon. The latter was a particularly delightful place which has, alas, succumbed to "progress" and is all but unknown to present-day Monrovians, access to it being blocked by an ill-conceived and unsightly debris basin.

Finally, Francis was read- for college having kept up his school work through correspondence courses and in 1921 he entered Otterbein College at Westerville, Ohio--his father's alma mater. He pursued his studies assiduously but in addition to his academic work he participated in many student activities. He was manager of the Glee Club, manager of the Sibyl, the collega annual. More important, it was here that he met his future wife, Teresa Elizabeth Saxour, who was his classmate. On June 17, 1925 they received their AB degrees together and were married later in the same day. Next, Francis entered the College of Medicine at the University of Cincinnati, also his father's medical school, and graduated with the degree of Doctor of Medicine in 1929. Then

followed a year in the Los Angeles County Hospital as a resident intern.

I have before me Francis' "Lefax" pocket notebook which he must have carried with him while he was in college. It is crammed to the limit of its capacity with notes of all sorts and shows evidence of being much used over the years. One section named "Facts and Suggestions" illustrates the workings of his introspective mind. Evidently it was his habit to jot down for further consideration thoughts that had crossed his mind and questions that he had raised within himself for further exploration. Most of these are dated at the time he was in college at Otterbein and later at medical school. Here are a few random samples illustrating the scope of the field over which his mind played from time to time:

"Is it not probable that the fineness of the hair may be an indication of the thickness of the skin? 3/14/25

Why is malignancy rare in the duodenum? 1/19/28

Is hunger caused by the deprivation of body tissues of carbohydrates? 1/27/28

Is it possible that cancer may be produced by intestinal bacteria which liberate an enzyme that has power to cause the cells of specific tissues to proliferate. The tissues being in such a state that trauma starts the proliferation?

Is the potential required to produce a spark in any way dependent upon the position of the gap in the earth's magnetic field? 2/13/25."

It would be of interest to know how he resolved the questions posed in the notebook but unfortunately he made no notes of the answers, if any were found.

It was while he was in medical school and remembering the many illnesses he suffered in his younger days that he developed a "hatred", as he expressed it, of the way that civilized man has treated himself and his children in allowing them to become victims of chronic illness. It was through that hatred that he was impelled to investigate the reasons for this state of affairs. His point of view was developed not alone from textbooks but was stimulated by certain inspiring precepts of some of his instructors during his medical school career who dared to question the advisability of certain phases of our great scientific progress and certain of the public health programs instituted by modern medicine. Thus was implanted within him the "need to know" which later led to his extensive study of nutrition and foods.

I have said that Francis was a born experimenter and had a vigorous and inquiring mind. With this endowment he made numerous improvements in medical techniques and produced at least two patentable inventions. His earliest contributions to a medical journal appeared in the Journal of the American Medical Association November 1930. They described "Rubber Flask Connectors for Hypodermoclysis, Intravenous Therapy and Other Uses" and "A New Syphon System for Maintaining Continuous Drainage Without Air Block in Thoracic Empyemas and in Infections of Other Body Cavities." These were developed while he was an intern in the Los Angeles County General Hospital. The latter system, known as the Pottenger Drainage, was adopted by the Chest Surgery Section of the Hospital and is still in use there.

On June 6, 1934 Francis and James R. Balsley as co-inventors, applied for a patent covering an "Airplane Navigating Apparatus" which was an automatic position-indicating system using infrared rays to provide guidance for the safe landing of aircraft under conditions of substantially no visibility. Twenty-two claims were allowed under the patent which was granted by the United States Patent Office on February 9, 1937 as Patent No. 2070178.

In his work Francis had need for a refrigeration plant but he was bothered by the problem of keeping the refrigerant free of lubricating oil from the compressor. He devised a successful means for overcoming this problem and on August 30, 1948 applied for a patent for a "Refrigeration System with Refrigerant Cleaning Means." The patent

with nine claims was granted by the United States Patent Office on February 9, 1937 as Patent No. 2618132.

During the latter part of 1961 Francis became intrigued with a method for percolating coffee with cold water rather than hot or boiling water as is done with conventional percolators. In his opinion cold percolation produced a more flavorful brew than that made by the use of hot water. However, a review of prior patents by his attorneys showed that Francis' device was not sufficiently novel to warrant an application for a patent.

Again, early in 1964 Francis conceived an improvement for the ear-piece of the doctor's stethoscope which would allow its use with or without a hearing aid. However, in the opinion of his patent attorneys the device was not patentable and the application was dropped.

Prior to his untimely death Francis had underway a project wherein he attempted to develop an accurate method for producing simultaneously a photograph and X-ray of an object under study. This method was developed primarily for the study of the human skull and in particular the temporomandibular joint or the jaw hinge. He was successful in developing the photographic and X-ray equipment capable of giving the desired results, i.e. simultaneous exposure with an accurate superimposition of the X-ray and photograph. He believed this method including certain related developments should be covered by letters patent but I do not know if this was successfully completed.

This method was devised to further an investigation of changing trends in the human skull configurations over a span of four generations, roughly placing the periods at birth prior to 1900, 1920, 1940 and 1960. The basis for this study consisted of X-rays of the skull, hand, foot and thorax together with anthropometric photographs and measurements on some 7000 individuals. Preliminary study suggested the change in configuration of the American from the broad-shouldered male with narrow pelvis, with a heavy short neck and his counterpart the narrow-shouldered female with broad pelvis and relatively long neck, to the broad pelvis male, with small weak shoulders and the female with narrow pelvic girdle and broad shoulders. The greater height and weight and other anthropometric measurements that are known in our present society were also borne out.

As mentioned above, a particular phase of this study was that of the temporomandibular joint. The development and degeneration of this joint was noted in the study of several hundred cats and their diets. The human studies just mentioned appeared to suggest the degeneration of the human temporomandibular joint might have had a similar background.

Another device which Francis worked upon ca 1924 was a lawn sprinkler which produced a spray that covered a square area rather than circular as is the case with most conventional sprayers. The secret of this device depended upon shaping the orifice of the nozzle in such a way that the angle of elevation was varied with respect to azimuth in accordance with ballistic theory. I remember making a drawing for him illustrating the principle but whether he pursued the idea far enough to apply for a patent I do not know. Calculations that he made for this device are contained in the Lefax pocket notebook mentioned earlier.

Following completion of his resident internship at the Los Angeles County General Hospital he became associated with his father at the Pottenger Sanatorium in Monrovia as a full time assistant from June 1930 to May 1941 and part time assistant from 1941 to 1945. In addition to his duties as clinical assistant he at this time also began his researches in the treatment of asthma and in the field of nutrition.

In 1940 he became the owner and operator of the Francis M. Pottenger, Jr. Hospital at Monrovia for the treatment of nontubercular diseases of the respiratory system, particularly asthma, which continued for twenty years until it was closed in 1960. He then devoted his entire time to his clinic and office practice until

his untimely death.

Pasteur once stated: "In the field of scientific experimentation chance favors only the mind which is prepared." Because his mind was prepared Francis was favored by two discoveries which happened by chance. In his search for ways to treat asthmatic patients Francis studied the work done by Drs. Pfiffner and Swingle with the adrenal gland. This led to a program of treating his asthmatic patients with high protein diets supplemented by freshly ground adrenal glands. To his surprise this treatment resulted in marked improvement in most of his patients. This led to further study of and a research program on the adrenal hormones.

Adrenal glands were obtained from cats and Francis noted that the cats having the largest adrenals were the unhealthy ones and that these were the ones that had a poor survival rate after the adrenalectomy. The more healthy cats had smaller adrenals and a better survival rate. To find out the reason for this he embarked on a program for studying the effect of the cat's diet on their health and growth.

The work that perhaps brought more fame to Francis than any other was his classic study of the effect of diet upon successive generations of cats. This exhaustive study covering a period of about ten years is reported in his paper: "The Effect of Heat-Processed Foods and Metabolized Vitamin D Milk on the Dentofacial Structures of Experimental Animals"--(American Journal of Orthodontics and Oral Surgery, Vol. 32, No. 8, pp 467-485, August 1946). It seems worthwhile to summarize this work briefly here:

"Feeding experiments were conducted to determine the effects of raw and cooked meat. Another series of experiments went on to compare the differences resulting from the feeding of raw and processed milks.

1 THE MEAT STUDY

Two diets were used in this study:

Adequate diet A: 1/3 Raw milk and cod liver oil plus
2/3 Raw meat.

Deficient diet B: 1/3 Raw milk and cod liver oil
2/3 Cooked meat.

2 THE MILK STUDY

Five diets were used in this study:

Diet A: 1/3 Raw meat and cod liver oil.
2/3 Raw milk.

Diet B: 1/3 Raw meat and cod liver oil.
2/3 Pasteurized milk.

Diet C: 1/3 Raw meat and cod liver oil.
2/3 Evaporated milk.

Diet D: 1/3 Raw meat and cod liver oil.
2/3 Sweetened condensed milk.

Diet E: Raw metabolized Vitamin D. milk only.
1 From cows on dry feed.
2 From cows on green feed.

SUMMARY

(1) Cats fed two thirds raw meat and one third raw milk were healthy and reproduced in homogeneity. (2) This was also true of cats fed one third raw meat and two thirds raw milk.

Cooking the meat of Group (1), or substituting heat processed milks for raw in Group (2), resulted in heterogeneous reproduction and physical degeneration that increased with each generation. Kittens of the third generation failed to survive six months. Diet E produced unexpected results, i.e. rickets and early death of male kittens.

Vermin and parasites abounded. Skin diseases and allergies increased from an incidence of five percent in normal cats to over ninety percent in the third generation of cats fed on deficient diets. Susceptibility to infections rose markedly and severe osteoporosis was universal. Mortality was high. These cats suffered from most of the degenerative diseases encountered in human medicine, including endocrine dyscrasias. Autopsy findings were revealing.

Change was shown not only in the immediate generation, but also as a germ plasm injury which manifests itself in subsequent generations of plants and animals. Four generations on raw meat and raw milk were required to bring some of the second generation of degenerating cats back to normal."

A motion picture based on this study was made and was shown before many medical and dental groups as well as before the American Medical Association as a part of the exhibit at New York and at Atlantic City. It was also shown at the Clinical Session at Los Angeles. Later, Francis was invited to discuss this subject before a meeting of the American Veterinarian Medical Association in San Francisco.

During his professional career Francis authored many papers and articles which were published in the medical literature. Appended hereto is a list of these. While I can profess no competency as a judge of merit in medical literature the list does seem to me to be impressive.

In addition to being a prolific contributor to medical literature, Francis was a member of numerous medical associations and societies as follows:

- American Medical Association
- California State Medical Association
- Los Angeles County Medical Association, (Past President of the Foothill Branch)
- American Therapeutic Society, (Editor 1941-55, President 1953)
- American Association for the Advancement of Science.
- American Academy of Applied Nutrition, (Past President)
- Fellow of the American College of Physicians Endocrine Society
- American Geriatric Society
- American College of Sports Medicine
- International College of Applied Nutrition
- American College of Chest Physicians
- Association for the Study of Internal Secretions.

Francis was among the first in his profession to recognize the hazard to health caused by air pollution in Los Angeles County. He worked indefatigably over a period of many years to mitigate its deleterious effects upon human health. His efforts were widely recognized and as a result he became a member of the Los Angeles County Air Pollution Control District's Scientific Committee on Air Pollution as well as membership on the Air Pollution Committee of the American College of Chest Physicians.

As Medical Service Chief, Civil Defense Area D, Region 1, State of California, Francis was active in Civil Defense affairs in the Monrovia area. The first portable hospital to be set up in Los Angeles County under simulated disaster conditions was a project under his direction.

In addition to the heavy demands on his time by his medical practice and other commitments he found time to be Assistant Clinical Professor of Experimental Medicine at the University of Southern California beginning in 1945. Aided by a grant from the United States Public Health Service and by donations from grateful patients he continued his study of the human temporomandibular joint and development of the face.

In the early sixties Francis became interested in the investigations done by the late Dr. Weston A. Price, a dentist who did pioneer work in comparing the effect of

primitive and modern diets of native peoples and their teeth. This work was based on a world-wide survey of native populations which demonstrated the dramatic degeneration of their teeth when "modern" foods were substituted for those upon which the populations had subsisted since time immemorial. Dr. Price reported his results in his classic book, NUTRITION AND PHYSICAL DEGENERATION.

Francis, recognizing the value of Dr. Price's findings and noting therein corroboration of his own work, became chairman of a committee which was formed for the purpose of preserving the important parts of Dr. Price's collections and promoting dissemination of his findings through exhibits, educational programs and the printing of a new edition of his book, which had long been out of print. Later the work of this committee was taken over by the newly organized Weston A. Price Foundation, a non-profit organization, and Francis continued his interest in the new group.

Upon Francis' untimely death in 1967, the Pottenger family decided to intrust his important research data, slides and exhibit material, and reprints of his professional papers to the Foundation. In appreciation of this confidence, the Board of Directors deemed it fitting to change the name to the Price-Pottenger Foundation. More recently the name has been modified to the Price-Pottenger Nutrition Foundation to more nearly reflect its purpose. It continued to disseminate the findings of both men.

Francis was the recipient of several awards for distinguished service. In 1951 he received an award from the Texas State Dental Association for the Advancement of the Science of Dentistry in Texas. A Certificate of Appreciation was given to him by the Los Angeles County Medical Association for outstanding service as Chairman of its Smog Committee for the year 1954. In 1959 he received the State of California Certificate of Commendation for "unselfish and dedicated service in the development of non-military defense preparedness and valued assistance in providing for the maximum safety and protection of lives and property in California in the event of war-caused of local disaster."

Perhaps the award that touched Francis more deeply than any other was the Distinguished Alumnus Award presented to him at Otterbein College on Alumni Day, June 5, 1965 by Dr. Harold Bota, Chairman of the Board of Trustees. In presenting the citation Dr. Bota praised Francis' distinguished career in medicine and public service.

Francis was a member of the United Brethern Church and the Masonic Order both of Westerville, Ohio. His other memberships included the University Club of Los Angeles, the Rotary Club of Monrovia, the Alumni Association of Otterbein College and Alpha Kappa Kappa Fraternity. He served as medical advisor to the Monrovia Civil Defense Organization and the Citizen's Advisory Committee for the Monrovia High School.

This memoir would not be complete without mention of Francis' wife Elizabeth and their family. As mentioned before, Francis and Elizabeth were married on the day of their graduation from Otterbein College. During her time at Otterbein and while pursuing her academic work there, Elizabeth had been under-secretary to President Walter G. Clippinger of Otterbein for three years and it was he who officiated at their marriage ceremony. After Francis had entered medical school she attended graduate school at the University of Cincinnati for two years, receiving her master's degree in English and a number of credits toward a doctorate. Her further formal education was ended by the arrival of their first child, Francis Marion III, on July 19, 1928. In all, four children were born to them, Francis III being followed by Margaret Elizabeth on December 15, 1929, Barbara Jane on March 31, 1931 and Samuel Slater in 1934. The four children went on to college in their time; Francis III to Otterbein, Margaret to Stanford, Barbara to Otterbein and later to William and Mary, and Sam to Montana State.

It has been said that behind every great man there is a dedicated loving woman and for Francis, Elizabeth was that woman. Her married life was completely devoted to her husband, her family and to others. With all her cares as a mother to her children she still found time to help her husband with his researches and the writing of professional papers. With her brilliant mind she was invaluable to him as a research assistant, doing the scanning of medical literature and abstracting the significant items about which her husband should be informed. She was a good critic and often prevented material in which Francis was not at his best from reaching publication.

She took an active part in Community life. The P.E.O., the Children's Hospital Guild and the Foothill Area Auxiliary of the Los Angeles County Medical Association—all were the beneficiaries of her interest and support.

Her full and active life was cut short by her untimely death in her sleep on December 12, 1965, deeply mourned by her family and a host of friends.

Francis continued on alone until December 21, 1966 when he married Mrs. Hilda Rethlefsen, an old friend. Their married life was all too brief. Shortly afterward, on January 4, 1967, Francis died suddenly in Glendora after being stricken with a heart attack.