FRANCIS MECHNER'S SECTION

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FRANCIS MECHNER'S SECTION

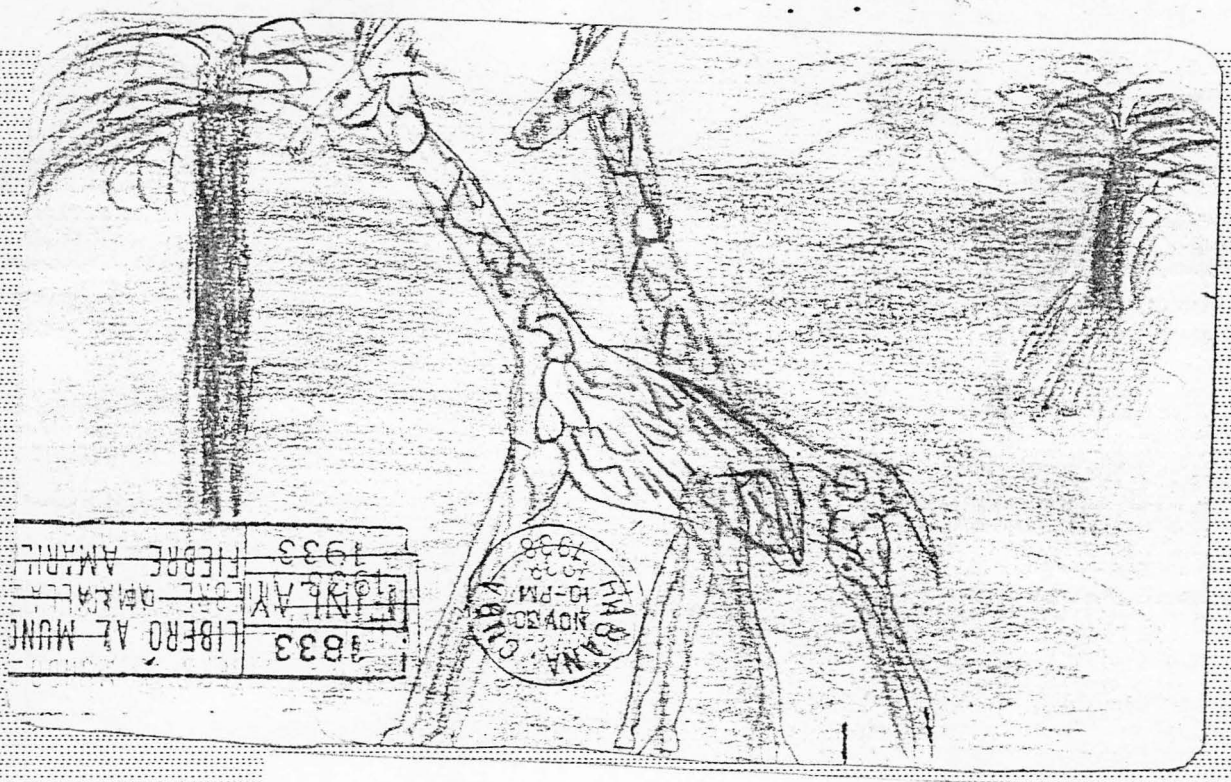
Dear Father,

I want to thank you, on behalf of your descendants, for this Family Biography. Every person, many times in his life, becomes uncertain about who or how important he is, and at such times needs to be reminded of what it took to produce him. By giving us this Family Biography, you have given us a glimpse of what it took to produce us: The labors, struggles, sufferings, creative acts, and luck of generations of fine and capable people.

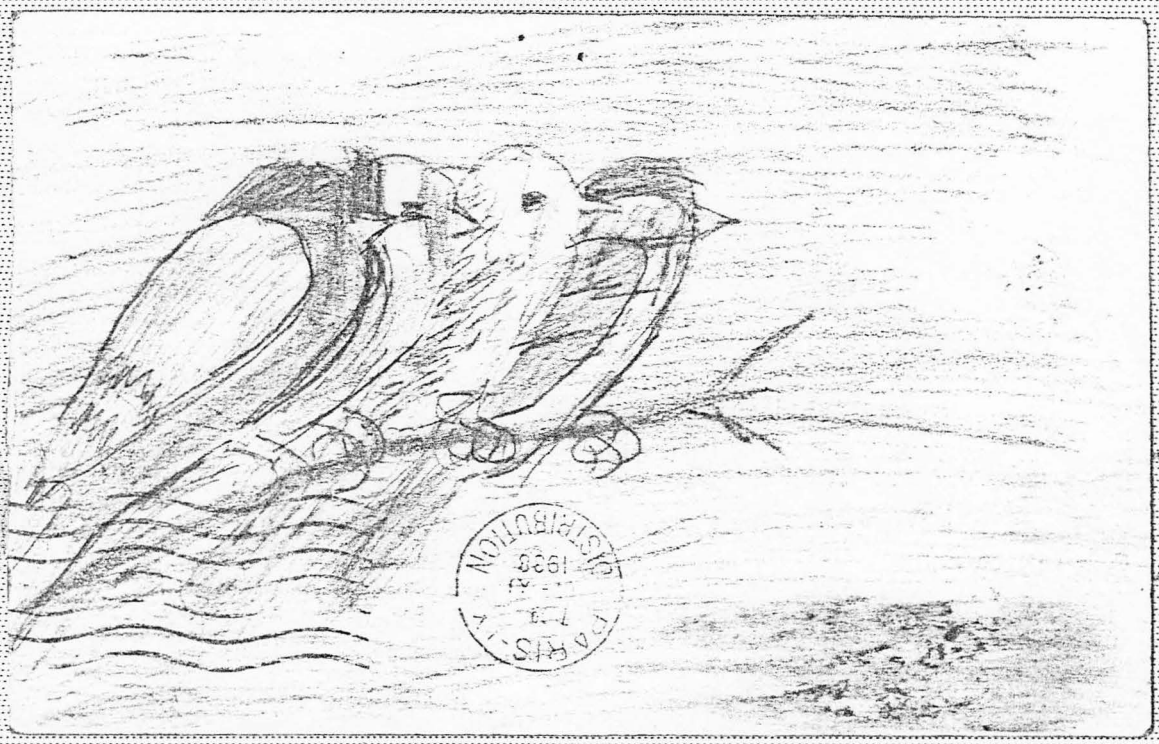
Therefore, with my own children in mind, I take great pleasure in contributing to this work some of my own recollections and thoughts.

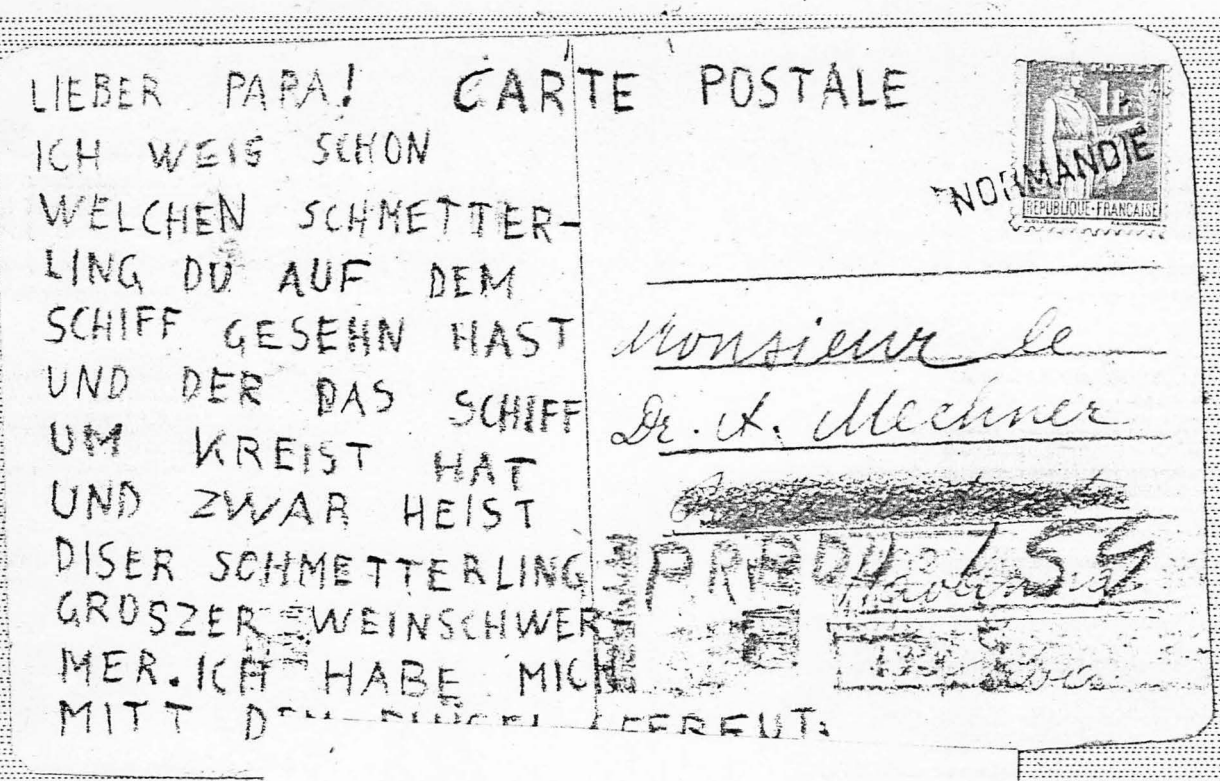
Love,

Francis



Postcard written by Francis to his father in November 1938, about one month after his father had gone to Havana. It says, "Dear Papa, I know now which butterfly you saw circling the ship. It is called Grosser Weinschwermer. I was very pleased with the (butterfly) wing."





CARTE POSTALE

LIEBER PAPA! ICH WEIS SCHON WELCHEN SCHMETTER-LING DU AUF DEM SCHIFF GESEHN HAST UND DER DAS SCHIFF UM KREIST HAT UND ZWAR HEIST DISER SCHMETTERLING GROSZER WEINSCHWER-MER. ICH HABE MICH MITT D[illegible] [illegible]EUT.

NORMANDIE

Monsieur le
Dr. A. Mechner

Postcard written by Francis to his father in November 1938, about one month after his father had gone to Havana. It says, "Dear Papa, I know now which butterfly you saw circling the ship. It is called Grosser Weinschwermer. I was very pleased with the (butterfly) wing."

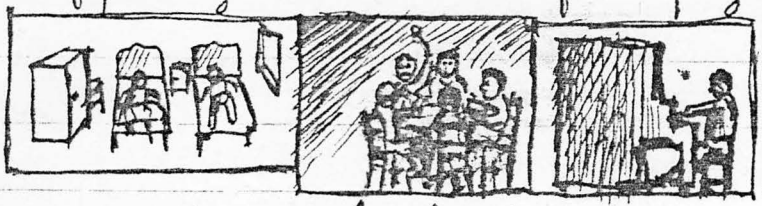
CARTE POSTALE

LIEBE FRAU DR. SAXL! ICH WERDE BALD WIEDER ZU IENEN KOMMEN. WERDEN SIE SICH DAN SEHR FREUN? WANN WERDEN SIE SCHON ENDLICH ZU UNS NACH ROBINSON KOMMEN DA WERDE ICH MICH SICHER SEHR FREUN. VIELE GRÜSSE VON FRANZI, UND VIELE GRÜSS VON LISA.

Madame 604
Paul Saxl
Hotel Scribe
rue Scribe
Paris

Dear Joan

Now I will write and draw you everything I have done to day. I slept till half past eight. Then we ate brakfeast. I played piano and I played with the birds



the whole morning. In the afternoon I wrote you a letter and then I delivered a cake for Lisa. Then I painted a lanscape. After this Lisa bought me an icecream After supper I played cards and Lisa had visit. Then I continued to write your letter and then I wrote my diary. Then I went home.

This is all what I did today. Mrs Gerenday sends you a thousand kisses. I hope you are well 1.000.000 kisses from your brother

François

Letter written by Francis to Joan about November 1943 from Havana to New York.

Querido mama y papa.

Esta vez yo escribo una carta en Español para no olvidar este lenguaje. Hoy yo no me siento muy bien y mi garganta me duele un poco pero no tanto como la otra vez. Ya me siento mejor que esta mañana. Yo tengo esto porque ayer hemos jugado un juego al otro lado del lago y tuvimos que caminar dos millas en una lluvia terrible. Yo tenia frio. Pero esta noche yo seré completamente bien. Algunos otros muchachos son enfermos tambien. No me dieron nada de comer todo el dia y tengo una hambre terrible. No me dieron nada a bb beber tampoco. Hoy me dijeron que Alemania se rindio pero yo no quería creer lo. Papa estudia mucho todavia? Yo escribi una carta a Juanita pero ella no me respondio. Ya no me gusta aqui tanto que antes. Lo que no me gusta son los muchachos porque son muy bobos. Escribame la direccion de la familia Uteil por favor. (This is all I have to write you) Esto es todo lo que tengo que escribirte. Muchos besos,

Fransisco

Postcard written by Francis to his parents in July 1944 from a summer camp in Pennsylvania to Brooklyn.

I will recount some episodes from my early childhood in more or less chronological order, as I remember them. I will confine myself to my direct recollection, and exclude information or events about which I was subsequently told by others.

I was born in Vienna on May 1, 1931 (This, I must admit, is based on hearsay) and we lived at Taborstrasse #64 on the second floor of an apartment building. One of the six rooms of our apartment served as my father's doctor's office, and another doubled as his waiting room and our music room. Every summer our family went to the country. The first summers I recall are the ones we spent in Unterach on the Attersee in 1932 and 1933 . We were there with my mother's parents, my father's mother, and mymother's sister Lisa. My father's mother Bertha used to take me on walks and teach me how to count by means of a poem that went "Eintz, zwei, Polizei; Drei, vier, Grenadier; Fünf, sechs, alte Hechs; Sieben, acht, gute Nacht; Neun, zehn, schlafen gehen; Elf, zweulf, heulen die Wölf." My mother's mother Gina also used to take me on walks, usually shopping. The big attr^action for me was going to the butcher's with her where I had made friends with a huge St.Bernard who was much taller than I. As soon as we got to the butcher shop I would get out of my baby carriage and go behind the counter where the dog was usually sleeping. My other playmates were two small children with whom I remember rolling down a grassy hill behind the house. In front of the house were metal tables and chairs and I remember practicing climbing up on the chairs with grandmother Gina watching me.

Not far from the house was the boathouse in which various boats were kept. I remember being frightened by that boathouse because it was so dark and musty smelling, but at the same time I found it exciting because being in

it was usually the prelude to a boat ride on the lake. I remember in particular a hair raising motorboat trip on which Lisa's boyfriend Mr. Geiringer one took Lisa and me. It is possible that I acquired my love for mountain-surrounded lakes as a result of these early summers on the Attersee.

It was probably the railrod trips to Unterach at the beginning of every summer, and the railroad's role in bringing father and taking him away on weekends, that stimulated my obsession with railroads at the age of one. I used to arrange any movable objects in the shape of railroad trains, and drew "railroads" on any available surface. I became precocious in drawing at the time I turned two, and by the age of two and a half I was drawing recognizable figures and objects (See page 90.2) such as hunters. Drawing was one of my favorite pasttimes from a very early age, and paper and pencil were always my favorite toys.

For the summer of 1935, father, mother, and I went to Gabice al Mare, a small Italian town near Rimini, which was already then a favorite summer resort of the Viennese. First we went to Venice for a few days. We stayed at the Hotel Marconi which I remember clearly. I particularly enjoyed the meals in the hotel's restaurant because I was permitted to go to the kitchen to ask for water, "pasta shutta" whatever that may have been, and other things I desired. Before each trip to the kitchen, father would instruct me in the proper Italian phrases, and I would rehearse these until I arrived in the kitchen. A less happy memory of that restaurant was the time I broke a fine crystal glass. Venice is also memorable to me becase of the gondolas. From the first time we rode in one, their unique shape captured my imagination. I drew them at every opportunity, and collected the souvenir gondola models that were sold in hotel lobbies and souvenir stores, and were displayed

wherever there were tourists. Another strong memory of Venice for me were its characteristic odors of the ocean and decaying marine life. Many of those odors are associated in my mind with the smelly squid that seemed to be everywhere and the squids' white oval skeletons whose shape and texture intrigued me. Other memories of Venice include a visit to a museum where I was particularly impressed by a painting of San Sebastian which showed his mostly-unclad body shot full of arrows. I suspect that the painting appealed to me at the human rather than the artistic level. I also remember feeding pigeons on the Piazza San Marco.

From Venice we went to Rimini and Gabice al Mare where we stayed in a hotel very near the beach. We had a small room, and to get to the bathroom I had to turn two corners in the hotel corridor. Vivid in my memory is the time when I looked down that corridor into the toilet whose door was wide open and saw, sitting on the toilet with his pants around his shoes, a somewhat older boy who was also staying at the hotel and of whom I was somewhat afraid, looking surprisingly human and unthreatening.

My major obsession in Gabice (I always had one, wherever I was) was the moths that flew around the lantern lights that illuminated the paths leading to the beach. The moths were mostly small and uninteresting, but I had never seen the phenomenon of moths flying around lights before, and the hope of catching a big beutiful one was never extinguished for the duration of our vacation. To this day, the German word for small moth "Motte" still conjures up for me memories of our evenings in Gabice, and I felt that the Italian word for night "notte" must somehow be related to the German word "Motte".

I greatly enjoyed the beach in Gabice. I had never been on the ocean before, and the sand was a great new toy. I spent many hours on the beach drawing pictures and long illustrated stories in the wet sand. The stories were

always about the adventures of animal characters or about hunts. When pencil and paper were not on hand, I generally found a substitute.

One time, father and mother asked me to stay in the hotel alone for the evening while they went out in Rimini. I was somewhat frightened at the thought of being left alone, as this would have been the first for me, but consented when they bribed me with the promise of a surprise that they would bring back for me. The surprise turned out to be a small metal motor boat propelled by gas that had to be lit with a match. I spent endless hours making the boat putter across the length of the bathtub, and this boat was an important toy for me for the next number of months.

Some of my important childhood memories of Vienna relate to my frequent walks and outings with my grandfather Benjamin Ziegler. As he was a doctor, he often took me along when he went to make housecalls. On these housecalls he often tried to explain to me the nature of the patient's illness. On one occasion he told me that the patient we had just visited had liver disease. Years had to pass before I was again willing to eat liver.

Grandfather also liked to visit coffee houses, which used to be popular hangouts for Viennese intellectuals. His favorites were the Kafe Schoeffel which was downstairs from his apartment, and the Schweden Kafe which was on the other side of the Schweden Bruecke (the bridge that crossed the Danube canal at the end of the Taborstrasse). We often went there together. On the way, Grandfather bought a roll in a bakery, for the use of a certain special newspaper vendor. That newspaper vendor, who was stationed in front of the Schweden Kafe would stick out his long tongue, place pieces of roll on it, and allow sparrows he had trained to alight on his tongue and eat the pieces of roll.

Across the street from the Schweden Kafe, facing the Danube canal, was a unique

Italian ice cream store at which grandfather bought me ice cream many times. In the Danube canal itself was a fish hatchery or breeding station, and I used to look down from the street and see thousands of fish swimming around in their compartments. In the Schweden Kafe we often met Mr. Rosegg, an uncle of Paul Rosegg whom Lisa later married. Mr. Rosegg always did tricks for me, the most memorable of which involved wetting the edge of a glass of water, putting a square piece of paper over the glass, and lighting the four corners with a match. The sheet of paper would burn to the edge of the glass, leaving behind a perfect paper circle.

For the summers of 1936 and 1937, mother, her parents, and I went to Zinkenbach, a small village on the Wolfgangsee directly across from St. Wolfgang. We lived in a farmhouse there, which we shared with the farmer family that lived there year-round. There were several children two of whom I remember very clearly -- Gustl with white-blond hair who was my best friend in Zinkenbach, and Pepperl who was crippled and got around by dragging himself on the ground -- he couldn't walk. I used to give the children drawing instruction. They sat around the large wooden outdoor table with me at the head of it. I gave each child paper and pencils and required them to copy whatever I drew, usually butterflies and other animals. While Gustl admired me for my artistic ability, I admired him just as much for his ability to whistle recognizable tunes.

Across the Wolfgangsee was the town of St. Wolfgang and immediately to the left of it the "Weisse Roessel" (the original White Horse Inn). We often went swimming in the lake, and for a while mother used to take me to St. Wolfgang for swimming lessons. The teacher tied a cork belt around my waist and held me up with a fishing pole. I hated these lessons, but quickly learned to swim.

Father visited us in Zinkenbach every weekend. He would take me on walks, fishing,

in the Wolfgangsee, and butterfly catching. There is one fishing expedition I remember particularly vividly. We went out in the morning and father said that since there was no cheese in the house we would stop at a store along the way to the lake to pick up some. He bought some Swiss cheese. At the lake we went out on a pier the edge of which was about one foot away from the wall of a boat house. Father cut a piece of cheese of about two cubic centimeters, put the hook into it, and dropped the line into the water between the pier and the boathouse. Within one minute he pulled out an enormous carp. We ate that carp for days afterwards, boiled and cold with "sultz". Another time he caught a rather large pike from a rowboat, going through the reeds, using the same . Swiss cheese as bait. He told everyone that this was a miracle as it is supposed to be impossible to catch pike with cheese as bait.

On one of our butterfly catching expeditions we rowed across the Wolfgangsee to St.Wolfgang. First we went into an inn for some lunch. As we walked in, we saw a hunter passing by carrying a huge deer he had shot, slung over his shoulders. I was revolted by the blood that was dripping from the deer's nose, but was nonetheless fascinated by the hunter's elegant hunting outfit and rifle. Then we took the cog railroad up the Schafberg which is the mountain behind St. Wolfgang. At the top we got out and climbed a bit further. Soon we came to a large flat meadow on which father said we would probably find apollos. We did but to my partial diaappointment they were all Schwarzze Apollo's rather than the regular or Alpen Apollo with the red spots that I had always hoped to find, but never did. Then we ate our sandwiches and soon headed back home.

Another type of hunting my father and I did was for birds. Father had brought me bird traps from Vienna which worked by snapping shut on the feet of any bird that sprung the trap by alighting on the plate that held

the bait. The wire had thick felt wrapped around it so that the bird's feet would not be injured when the trap closed. I was particularly fascinated by the Kleiber, Gimpel, and one or two other local species. The closest I ever came to catching a bird of one of these species was when a Kleiber briefly got caught but pulled himself loose in about two seconds. That was an exciting moment for me . I did catch a bird once, though, and put him into a cage. Unfortunately he wouldn't eat anything we fed him, and after about a week he died. Father, who had studied taxidermy, stuffed him. One time, when father and I went for a walk, we stopped in at the house of a local friend of my father's who also hunted. As we were standing in his garden chatting, we saw a Kreutzschnabel sitting on a fence about ten ~~years~~ yards away. The man quickly ran into the house, came back out with his shotgun, and took aim at the bird. I began to cry and asked him not to shoot the bird, a request to which he consented immediately. My father explained to him that I had a very soft heart for animals.

The walks I took with my grandfather around Zinkenbach are also memorable. Once we walked along the lake to the left til we came to the Zinke, which is a large gorge from which a rapid stream empties into the lake. The gorge was quite dark and lined with steep rocks, while on the other side we looked down into the rushing stream. I was quite excited as we walked through this gorge because I had been told by my father that this is the type of ecological setting in which one finds the Eisvogel butterfly, a type of white admiral, and even possibly the Schillerfalter. However, I never saw either. Another time, grandfather and I went to St.Wolfgang for lunch. He rowed our rowboat across. By the time it was time to head back, a severe storm seemed to be brewing. "Let's try to get back quickly before we get caught in that storm," he said. Unfortunatly, the storm did

catch us while we were still in the middle of the lake. Big waves began to rock our boat, and strong winds pushed us where we didn't want to go. Cold rain drenched us. I was quite frightened and kept urging grandfather to row towards Zinkenbach. I couldn't understand why he was powerless against the strong winds that pushed us in the opposite direction. I was particularly disconcerted that he seemed to be rowing with short ineffectual strokes instead of long vigorous ones. The boat finally was pushed into a gully where a stream emptied into the lake. We pulled the boat through the reeds, and grandfather finally got out, with his feet sinking into mud. He lifted me out and tied up the boat for retrieval at another time. It was a long walk home through the cold rain and high winds. The hot meal that grandmother served us on our return to the farmhouse tasted better than it would have under just about any other circumstances. But the really memorable aspect of this adventure was the anger I felt toward grandfather because of the physical limitations he displayed on the lake. I must have viewed him previously as omnipotent and super-athletic, and here he was, unable to control a mere rowboat even when my life seemed to depend on it. The awe and respect I had had for grandfather prior to that experience seemed to have crumbled and I found it difficult to forgive him for his clay feet.

However, most of my time in Zinkenbach was spent alone. I used to wander around the farmhouse and the adjacent fields. I scrupulously avoided a road leading to the lake on which there was a gypsy camp, because grandmother had told me that gypsies kidnap little children, and I felt that the look one of the gypsy women once gave me as we passed by provided incontrovertible evidence for grandmother's admonition. I also avoided certain parts of the farmhouse grounds, such as for example, an extremely smelly toilet which frightened me not because of its smell but because of the grotesque images my mind created in response to grandmother's humorously-

meant statement that this was the toilet used by the cows. Also somewhat frightening to me was Pepperl's physical condition, which made him unable to walk -- he dragged himself around on the ground on his Lederhosen made especially for this type of abuse. Handsome, blond-haired Gustl was my idol. Once we were walking up a forested mountain trail toward an ancient castle. Gustl was whistling beautiful tunes in his inimitable way, and I remember thinking how difficult it will be to bear to leave Gustl at the end of the summer. When we arrived at the castle, we explored large, cavernous halls with all kinds of scary ancient weapons on the walls. We were shown a deep pit in the center of one of the rooms where they alledgedly threw the bodies of slain warriors.

The rest of my time in Zinkenbach was about equally divided between drawing and butterfly catching. One of my great butterfly catching triumphs was my catching of my first mourning cloak. I can still remember how I saw him alight on a dung heap and spread his wings in the sun. I snuck up on him very slowly the way father had taught me, and then slammed my net down on him. My heart raced as I realized that he was really under my net. It was a magnificent specimen, and mother agreed to send it to father in a letter. Father later told us that it had arrived in perfect condition with one major exception -- its abdomen had been crushed by the letter cancellation stamp. However, he had replaced the abdomen with that of another similar butterfly, and had the mourning cloak mounted in a glass paperweight that he thenceforth kept on his desk. I was quite proud of that. The highlights of our stay in Zinkenbach were still father's occasional weekend visits, and the goodbyes when he took the train back to Vienna on Sunday night were always the occasion for tears. My drawing activities too revolved largely around butterflies. I drew them daily, and taught the local farm children to draw them, individually and in groups. I remember some of the children clamoring for drawing lessons when I was not in the mood.

Sunday outings were also an important part of my life in Vienna. With the arrival of Spring, which in Vienna tends to be a long and beautiful season, father and I would begin to go on Sunday excursions into the mountains that surround Vienna, usually the Kalenberg, and sometimes even the more distant Biesamberg. The outing began with the packing of our equipment (butterfly nets and cigar boxes on the bottoms of which father had glued slices of cork into which the pins could easily be stuck.) and our lunch. Then we took the number 5 bus to a point from which we would continue by walking. I remember one time when we had a delicious goulasch lunch on top of the Kalenberg while looking down over the thickly wooded slopes. On these expeditions we would generally catch Segelfalter, Schwalbenschwanz, and various less dramatic species. On our return home, we would mount the butterflies, usually the same evening while they were still soft.

One time I went on a Sunday outing with a friend of my father's and mine who was a butterfly collector, Mr. Streitz. The excursion was pleasant enough until I began to get extremely thirsty on the way back down the mountain. I wanted Mr. Streitz to buy me a G'spritzter which is a commercial carbonated lemonade sold in roadside stands. Mr. Streitz kept saying that there would probably be such a stand round the next bend, thus urging me on and appeasing my complaints. When the roadside stand still had not materialized after six or seven bends of road, my faith turned to anger and it was not til I got home that I quenched my thirst with several glasses of cold water from the hallway water faucet outside the entrance to our apartment. I still liked Mr. Streitz, but not to go on hikes with any more.

Another type of outing was the Sunday trip to the zoo in Schoenbrunn. I loved the zoo, which we reached by subway, and collected the entrance tickets.

Guests and visiting used to be an important part of our family life. We had dozens of relatives in Vienna, and dozens more in Tirnau, Czechosovakia. On two occasions that I remember we went to Tirnau and stayed at the Goldschmidt's large house. Although I was doted on there by dozens of loving relatives and taken to a fair and other exciting places, I still recall the experience as negative in the balance because of the formality of the Goldschmidt's household and the constant admonitions to which I was subjected to be on my best behavior.

I did, however, enjoy the entertaining and family gatherings at our house in Vienna. At these I could be the center of attention without having to leave my own turf. Christmas used to be an especially festive season for us. We always had a large Christmas tree that we spent many days decorating. I would make long elaborate paper chains, stars and other shapes cut out of cardboard painted with glue and dipped in tinsel, various other works of art, and candy wrapped in colored paper. Small candles were attached with wires to the thicker branches. On Christmas eve, father would don his Santaclaus costume and bring a big bag of presents for me (and later for Joan and me). He always pretended to be Santaclaus and tried to talk me out of any notions that it it could be he in disguise. For a time I had enough doubts to play it safe and not press my suspicions too aggressively. Some days before Christmas the holiday "Krampus" used to be celebrated in Vienna. For me, the Krampus holiday was always associated with an obsession with the little red and black devils made out of pipecleaners. These, along with candy, were widely sold, the counterpart of Easter rabbits and eggs at Easter. Our family also observed Easter religiously by painting and hiding Easter eggs for me to find and then to eat.

My life in Vienna on the second floor of Taborstrasse #64 was idyllic by any normal standard. Until the age of 5 I was an only child, doted on by parents, grandparents, aunts, and uncles. My grandparents' house was a few blocks up the Taborstrasse, at number 87, and I used to walk over whenever I had determined by way of quick phone call that the food or ambience there was more to my liking. At my grandparents' house I could generally count on my favorite Naturschnitzel dinner (veal cutlet with paprika) and fun and games with Lisa or grandfather. My favorite games with Lisa were getting up on her piggyback while she ran around the dining room table to the music of the Radetzky March (with the music constituting the essential ingredient), and letting her give me a "Chemisches Putzen" --- a chemical cleaning-- which consisted of her putting me into grandfather's examining chair in his office and cleaning my hands and face with a wad of cotton wetted with alcohol. When there were gusts at the Ziegler's, I would be asked to "perform" by drawing animals or scenes according to the guests' requests. "I couldn't do that", grandfather would say proudly to his guests.

When I was four or five, the family felt that my artistic talent should be cultivated more formally, and accordingly, I was taken to an art school. At the interview I drew a herd of antelopes, being careful to show each antelope in a different orientation --- side, three-quater view, front,and back. The professor was very much impressed and accepted me. When I was taken to the first class, I remember being quite frightened, as the youngest individual in the class was about 12 or 13, and the tables were much too high for me. So books were put under me until I was worried about not being able to get down by myself. Then the lesson began. "Das ist ein Hahn" (This is a rooster) said the bearded professor in a loud voice, pointing to a stylized rooster he had drawn on the blackbo. I remember being awed by the nasal quality of his voice as he bellowed the word "Hahn" and thinking that he sounded himself somewhat like a rooster who had a cold. Then he covered the board wit

a cloth that hung from the frame of the blackboard and told the class to draw the rooster from memory. As I was not just unimpressed but downright repelled by the professos's stylized rooster -- it had an oval for the body, another oval for the head, and straight lines for the outlines of the neck, feet, comb, beak, and tail -- I decided to draw a "good" rooster for the professor -- he obviously did not know what a rooster looks like. When he saw what I had drawn, he seemed upset. "No, no" he said, and showed me the picture on the blackboard again. I was on the verge of tears, but obediently drew the picture that was on the blackboard as accurately as I could. "Excellent", he said. Next, he gave the class some instructions which I interpreted to mean that we should draw a bird entangled in a string that was attached to a bush. Evidently, my interpretation of the instructions was incorrect, as the professor, upon seeing my elaborate drawing, said that it was all wrong. At that point I burst into tears and demanded to be taken home by my mother. Thus ended my formal training in art, and maybe that was for the best.

That experience made me very apprehensive about entering Kindergarten in the Fall of 1936, but I did anyhow, and there acquired great proficiency in the handling of scissors, paper, and glue.

My favorite toys in Vienna, at least those I remember best, were my extensive menagerie of stuffed animals whom I used as characters in long and elaborate dramas; then, my erector set "Matador" consisting of wooden blocks with regularly spaced holes and wooden sticks to connect the blocks, with which I built large elaborate machines that actually worked, including an automobile, a crane, and fantasy machines; and the family record player on which I played my favorite records -- arias from Rigoletto and Il Trovatore, Strauss Waltzes, and Mozart opera arias. But far more important than any of

these toys, from the time I was two years old, was pencil and paper. Drawing, and later painting, remained the most important activity for me from early childhood until the age of about 20.

In the winter of 1936, Lisa took me to the Semmering for a short skiing vacation. We stayed in an elegant hotel overlooking a mountain panorama, in which I was told that I had to be particularly well behaved. One of the meals we had in the hotel restaurant was made memorable to me by the fact that I threw it up on the fine table cloth. In addition to skiing, Lisa and I took snow walks through snow-covered hemlock forests which Lisa described as "Märchenwald" (Fairytale forest). The following winter of 1937-38 father took me skiing to Annaberg. By that time my skiing was good enough for me to partake in an excursion with a group of about a dozen grownups led by an instructor. We spent the entire morning walking up a mountain on our skis, then had lunch at the top. I tumbled quite a bit on the way down, and seem to recall traversing some of the final stretches on the instructor's back. Another day, also in Annaberg, father and I watched a ski jumping contest or exhibition, which I found awesome and frightening because of the danger I thought it entailed for the jumpers.

Another winter activity in Vienna were the almost weekly visits to the Augarten skating rink just a few blocks down the Taborstrasse. The rest of the year I was regularly taken for walks in the also-nearby Prater. First we would go through the big gate and down the chestnut tree-lined Prater Alee. In the Fall the big attraction there was collecting the horse chestnuts that had fallen to the ground, and back home boring holes through them with my hand drill and stringing them together into long chains. I remember how enthralled I was year after year with the shiny rich brown color and texture of the freshly-opened chestnuts and the perfectly harmonizing color and texture of the gray spot. The person who most often took me on

the walks to the Prater was our vivacious, red-haired, and fun loving maid of long standing, Mitzi. Mitzi used to come into the living room in the morning and light the huge coal-burning tile stove which had one corner protruding into each of the four rooms it straddled. Another maid of ours Anna was more gentle and quiet and used to spend a lot of time playing with me. There was also a third maid whom I don't remember too well.

A big change occurred when Joan arrived in September of 1936. I remember waiting in the tree-lined courtyard of the hospital where Joan was delivered, for what seemed like an eternity, for father and mother to come down with Joan. When they finally did, we took a taxi home, and I think that this was my first ride in a car. My initial enthusiasm for Joan was short-lived. I quickly saw that I had lost my long-standing monopoly on everyone's attentions, and was even threatened and punished when I gave overt expression to these feelings. However, the Anschluss and our exodus in 1938 brought these problems to an early end.

Another important part of my life in Vienna was the piano. We had an excellent baby grand piano in father's waiting room, on which father played quite regularly. When his brother Karl, who was an opera singer among other things, came to visit us, father would accompany him in Lieder by Schubert, Schumann, and Loewe. I especially remember their performances of Loewe's Die Uhr, Der Wanderbursch, and Schumann's Die Beiden Grenadiere. I began to take piano lessons when I was about 6 but that proved to be a great failure. I absolutely refused to practice and the lessons had to come to an end.

I did not have many books in Vienna, but those I had played an important role in my development. There was a childrens' story about African animals, Max und Moritz, and other sadistic typically German stories told in rhyme

and illustrated copiously, including Struwelpeter. But my most important books were the butterfly books which I memorized in every detail and my father's natural history book which I studied endlessly.

In Vienna I spent a relatively small part of my time with contemporary playmates. There were the kids in Zinkenbach, the corner druggist's daughter Elfi with whom I remember playing some erotically oriented games from time to time, Postpischiel who was a low-class street urchin type I met in first grade and brought home from time to time to my parents' dismay; but no steady or significant friends. I was considered a well-behaved, obedient, and tractable child who did and believed what he was told. I was taught never to lie, to be polite and well-mannered, and I followed these rules of conduct conscientiously, even into adulthood and often to my detriment, I suppose.

The Anschluss occurred in April of 1938 and the swastika flags were soon to be seen everywhere. I became obsessed with that flag and spent weeks studying and drawing it with special attention to the exact proportions of the swastika, its relation to the size of the white circle, and the size of that circle to the flag as a whole, and drew hundreds of flags until I was sure that I had it exactly right. The day Hitler came to Vienna to give his nationwide address from the Nordwestbahnhof, his parade came up the Taborstrasse past our house. Some SA men came up to our apartment to guard the windows, but of much more interest to me that very same day was the hatching of some 20 ailanthus moths from their cocoons which I had collected from the ailanthus tree in our courtyard. The beautiful large months were flying around the apartment and hanging from the curtains, as the crowds in the street below were shouting "Heil Hitler". I was curious to see the swastika flags being waved down below, but far more visually fascinating to

me were the delicate gradations of Khaki and light purple on the wings of the freshly hatched moths,

With the Anschluss, our lives changed in many ways. I heard the members of my family talking constantly, with great apprehension in their voices, about arrests of relatives, the anti-Jewish campaigns, and horror incidents in which relatives or friends were picked up in the street and abused in various ways. One form of abuse that I heard discussed a great deal consisted of being forced to get down on all fours and wash streets with brushes and buckets of water. My parents instructed me not to reveal that I am Jewish if strangers on the street asked me. That advice came in handy one day when I was playing in front of the house and two SA men came up to me and asked me if I was Jewish. "I am not a Jew, I am an Austrian" I replied with feigned indignation, probably not realizing that I was possibly saving our lives with that reply. On two or three other occasions SA men actually came up to our apartment and tried to take my parents away for scrubbing duty or other abuses, but my father somehow conned them out of it each time.

Incidents like these persuaded my parents to keep me out of the city as much as possible. Once they sent me to Weidlingau on the outskirts of Vienna to stay for a while with Hella and Leo Ziegler. Leo was a painter and from him during that week I learned how to draw shadows on objects. Another time, over the summer, they sent me to the country with our laundress, Mrs. Brandeis. They tried to get me used to her by having her read to me at bedtime in Vienna. She took me to her little poverty-sticken village to stay in her farmhouse filled with flies, musty odors, coarse and dirty children, and animals. I was depressed from the time I arrived there. In one of the rooms lay a smelly sick man, totally paralyzed, with flies crawling

all over his face. All day long he made the same pathetic repetitive sounds. He had fallen from a ladder, I was told. I avoided that room as much as I could. During the day I spent as much time as possible on a nearby steeply inclined meadow catching butterflies, mostly Schachbretter. Mrs. Brandeis often took me and the other children on walks to local stores, where I was instructed always to salute "Heil Hitler" which I did, though somewhat reluctantly. She also took us to church and chapels, to the cemetery, and to a local supposedly haunted castle whose ghost stories I made her explain to me in full detail. I believe that my insatiable fascination with these stories lay in the fact she appeared to believe them. But in the evenings I would relapse into my depressions and cry myself to sleep night after night. It got bad enough that I insisted on phoning my parents and demanding that they come and get me, which they did after one week.

In September I was not able to go back to the same school in which I had completed first grade the year before, because an edict had been passed that Jews had to go to special schools. The prior year I had gone to public school where my teacher had been Professor Turek, whom I had liked and who had given me all one's, on a scale from one to five. I liked the tricks he used to teach the children how to read, like drawing the letters SCH on the blackboard to look like a locomotive to suggest the SCH sound, and other such mnemonics. In the Jewish school to which I was sent in September, we had a bearded rabbinical type as our teacher. He was certainly entertaining when he told us biblical stories with vigorous histrionics to add drama, but I did not feel much rapport with him otherwise. What fascinated me though was the calligraphy of the printed Hebrew characters. I quickly became obsessed with the exact shapes and proportions of the thickened portions of the characters and worked endlessly to acquire skill in drawing Hebrew characters that looked exactly like the printed ones.

Other things besides school were different in Vienna that September. People on the street were saying that war was inevitable. Air raid and blackout drills were conducted frequently, and all citizens were required to participate in these, by law. Light-tight black shades had to be installed on all windows, cars had to have special blue covers on their headlights, and to find one's way in the streets at night, one had to have flashlights with black covers and thin slits cut in the covers. To dramatize the importance of these drills, the Nazi's had placed models of bombs on various street corners. There was one near the entrance of the Prater, about two feet long and very rusty. I thought that it had been dropped by a plane.

All this came to an end for me on October 1, 1938 when father and I left Vienna for Paris. The whole family saw us off as we got into our taxi in front of Taborstrasse 64. I understood the enormity of this event for my future, but was nonetheless happy and excited to be going off with my father on what I knew would be a rather extended trip. As our taxi passed through the streets of Vienna, father pointed to certain well-known buildings and said, "Take a good look. It may be the last time you see it." I took a good look, and it worked because I remember to this day what I looked at. On the train to Paris, father read books to me endlessly, and of course, I drew. In Paris we were awaited at the train station by Lisa and Raymond, who took us to Raymond's mother's house Aunt Louise on the Plateau D'Avron. Suzanne, who is Raymond's sister, and her retarded daughter Nicole also lived on the Plateau D'Avron. Nicole quickly became my companion. She was seventeen and spent all of her time rolling up and untolling colored ribbons, called "Extraforts". She had a collection of hundreds of these ribbons. From morning till evening she would sit in her easy chair, rocking from front to back making repetitive sounds and rolling up and unrolling her extraforts with incredible speed and skill.

My days on the Plateau D'Avron were spent rolling and unrolling extraforts with Nicole, trying to become as skilful as she was. Equally fascinating to me were the catalogs and magazines for hunters that lined the book shelves of the house. I was fascinated by the pictures and specifications of shotguns and cartidges, and studied the catalogs until I had virtually memorized them.

Father, Lisa, and I stayed on the Plateau D'Avron for about eleven days and had much fun. I was expecting to leave with father for Cuba shortly. But on the evening of October 12, he told me that he would not be taking me to Cuba with him and was leaving by himself the following morning. I can safely say that this was the most traumatic incident of my life.

Lisa and I stayed at Aunt Louise's house on the Plateau D'Avron a while longer. I was given a large wooden truck as a present, which I modified endlessly with my tool kit. I would load my butterfly equipment on it and go on butterfly catching expeditions in the neighborhood of the house to catch Baerenspinner which were prevalent at that time of year. Nicole and I became good friends and spent much time together. But soon, either because they resented my intellectual superiority over Nicole or because our games were becoming tinged with sex play, Suzanne and Aunt Louise began to keep Nicole and me apart. Aunt Louise was generally upset with me. She nagged me for chewing too loudly, eating too fast and other patterns that I could not accept as faulty. Lisa and I soon moved away from the Plateau D'Avron to a suburb of Paris called Plessis Robinson. We moved into an apartment that we shared with Fritzi and Leo Zimmermann. Fritzi was the sister of Lisa's brother's wife. Although I liked Fritzi and Leo and loved being with Lisa who was a stimulating and vivacious person, I missed Vienna terribly and was unable to shake my sense of abandonment. Leo used to spend

While in Tiscornia, I had two overwhelming preoccupations: One was chasing the exciting tropical butterflies that I was seeing in vivo for the first time, and the other was quenching the thirst I experienced all day long as a result of chasing these butterflies in the sun. Running around in the tropical sun all day long causes perspiration, and I was not allowed to drink the local water. There were carbonated beverages on sale in the camp, but I was limited in the number of these I could buy. So, for the three days we spent in Tiscornia I was never quite able to get rid of my thirst.

Upon leaving Tiscornia, I began to gorge myself on fruit and other foods that I had not had for a long time. Lobsters could be bought for ten cents apiece, and mother would make gigantic lobster salads with Mayonnaise. It was not long before I was somewhat overweight. The metabolic or physiological shock of the climate and nutritional change also resulted in my running a continuous low-grade fever for about one year. But none of this prevented me from spending substantial amounts of time chasing butterflies in the fields around our house in the suburban area Ampliacion de Almendares where we lived.

The first months of being reunited with my parents and Joan had a honeymoon quality. We never tired of exchanging stories of our respective adventures and getting to know each other once again. Gone were all my old feelings of sibling rivalry with Joan, and she enjoyed having a big brother who told her stories, read to her, and played with her. Equally intoxiating to me were the tropical plants and flowers that bloomed everywhere and the tropical fragrances that permeated the humid night air of Havana.

Lisa lived with us and for a while I now had two mothers. A few months later, father succeeded in bringing Paul to Havana too, whereupon Lisa and Paul moved out and got married. Paul had very narrowly escaped deportation, and he told us that most of our other friends and relatives in Nice had not.

My father and I went butterfly hunting, almost daily in the nearby fields. One day, I had a great surprise. When I came into the house, there was a piano, which my father had bought from someone who was about to leave for Mexico. I became very interested in music, I started playing and practicing. Once father took me to a concert, the first concert I ever went to, where they played Beethoven's 9th and Schubert's 9th symphonies, two pieces, I had never heard before. There was generally a lot of cultural activity in Havana. There were many immigrants, many of them very interested in music and painting. We went to lectures, there was a radio, which we got, an RCA-Victor radio, a large console, on which we heard news about the war, occasionally music, interesting music programs. I gained weight very rapidly. We frequently went to the beach. We remained in close touch with Mr. Reder, who adopted me as his pupil in sculpting. I went to his studio every other day, and sculpted, made figures out of clay, and learned to paint with charcoal. Mr Reder had a tenant, whose name was Altmann, who was an oil painter, a young man, who lived upstairs and painted with very vivid colors. Altmann had a friend, Mr. Salomon Lerner. Mr. Lerner became very interested in me. He thought that I was very talented and offered to give me painting lessons. Mr. Lerner remembered me from Paris, because he had lived by coincidence in the same building where Lisa and I had lived in the rue d'Atlas at the same time. He remembered me and I remembered him. He remembered me from a time that Lisa went out on a date and left me at home alone. There was a storm that night and I became very frightened. So, I went downstairs to the conscierge, the superintendent, to ask whether there was a lightning rod on the roof. Mr. Lerner remembered that. I, in turn, remembered him, because I had seen his paintings being transported there from an exhibit he had just

had, on the day we moved in.

Mr. Lerner came over every day and coached me in oil painting. He taught me how to size cardboards. Every afternoon he came over and coached me as I painted still lives, flowers and portraits etc. He did not accept any money from us. He stayed about 3 hours every day. I admired him very much, and used to go to his house and admire his paintings.

The first year, I did not go to school at all. I studied English at home. Father had an English book, from which he used to teach me, and I practiced reading and writing English. After about one year, father thought I was ready to go to school, and he inscibed me in Miss Phillips School, which had classes both in English and Spanish. I went mornings only for the entire time I was there. Joan leter went to the same school. I spent most of my time in Havana painting, catching butterflies, and playing the piano. Sometimes father and I went to some hills near Havana to catch some unique local Uranids, which flew only at around 6 o'clock in the afternoon. Father had many patients in Havana, among them a family Weil, who were refugees from France. Mr Weil had a tannery in Matanzas and we visited him there once. I used to accompany father on his rounds, when he visited patients. Usually he had 5,6 or 7 patients a day. He charged one dollar per visit and I used to count the money he had made each day. Sometimes he would surprise me at the end of the day and take me and Joan to a movie. He had a patient who gave him free tickets to one of the theaters. On the way to the movie he would often buy a bottle of Coca Cola. which Joan and I shared. I also spent a lot of time with a sling shot I had made. Once I shot a bird by accident. I never thought I would actually hit the bird, but I did and it died. I was very upset and never sh shot at a bird again after that. Father stuffed it, but I don't

think it came out very well. We spent most of our evenings visiting with fellow refugees in Havana, since none of us had anything else to do. Everybody talked, drank coffee in coffee shops, and went to movies.

Lisa had an apartment and lived next door with Paul. She was in the cake business. She made pastries in her kitchen. Many of the refugees were her customers because she baked in the style to which they were accostumed. I was her delivery boy. She used to charge roughly one dollar per cake and I would get 5 cents for the delivery. When it was a long distance, I would get 10 cents. I made quite a bit of money doing that - about 20 dollars in two years.

My father and I once went landscape painting outdoors, using water colors. I still have the paintings, his and mine. Finally mother and Joan went ahead to the States to try to arrange for my father's and my immigration. She hoped to accelerate father's getting his quota visa. She had to go to a hearing in Washington. After about 6 months mother managed to get the permit for father and me to enter the United States. The visa arrived. We took a plane to Miami.

Miami had a completely different culture and civilization. I was struck by how quiet everybody was in the street. In Latin American countries people tend to be noisy and shout. I was struck by how civilized and calm the Americans were by comparison. I was also impressed by the fact that English was spoken and that the architecture was comparatively so advanced. Veryinteresting for me to see. We stayed in Miami for a few days, a nd met some friends there, Mrs. Wagner, whom my parents had befriended in Havana prior to my arrival from France.

Then we got on a train and went to New York. I remember what an exciting sensation it was, in passing from one car to another,

as we went to the dining car, when I was hit in the face by the chilly winter air. I had not felt cold air for 3 years, since Vichy. It was a vivid reminder of Vienna too. We arrived in New York in one of the greatest snow storms of recent times, February 1944. There were snow piles in the streets, one or two yards high. For all I knew that was normal for New York.

Today is July 8th, 1977, and I am going to dictate some of my recollections of Vienna, before I left in 1938. I have many early memories. I remember the summer in Unterach, when, I think, I was 2 years old. We were there two summers in a row and I remember a number of things, including the time I spent there with grandfather and granmother. My grandfather used to take me swimming and used to take me out in a rowboat. I remember there was a boathouse and we often went rowing together. And grandmother, I remember, used to take me shopping with her. She used to take me to a butcher shop, where there was a big St.Bernhard dog, with which I enjoyed playing. The following summers we spent in Zinkenbach on the Wolfgang See. We lived in a farm house there. Father was in the city attending to his practice and used to come out on weekends only. My grandparents, mother and I were in Zinkenbach. Grandfather and I again often went swimming and rowing, we went swimming almost every day. One of those summers I learnt to swim. I had a swimming teacher at the St.Wolfgang See. The swimming lessons were on the other side of the lake, in St. Wolgang, which was a little town. They used to put a cork belt around me and hold me like on a fishing pole to help me stay afloat while I swam. I didn't enjoy those lessons very much, but after a few of these lessons I was able to swim by myself, without the cork belt. Grandfather and I went to St.Wolfgang once in a while. We generally took the row boat and rowed

across. One time, on the way back, we were caught in a storm, and it started raining and the wind became rather strong. My grandfather was worried about whether we should go back to St. Wolfgang and wait out the storm. But he decided to try to get across. So, we were caught in a terrible storm. There were waves and the boat began to drift away from where we wanted to go. I was very angry at him for having decided to go across after all and for not being able to row the boat in the direction we wanted to go. We finally reached the shore about one kilometer downstream from Zinkenbach at a little estuary, where a river came in. We rowed into that river and eventually grounded the boat in a muddy bank. We left the boat there and walked home in the pouring rain. When we got home, completely drenched, it was already dark and everybody had been very worried about what had happened to us. Grandmother served us some very, very delicious hot food, which tasted particularly good after that experience. Other things I remember having done with grandfather taking walks into the Zinke of the Zinkenbach, which was like a gorge where the Zinkenbach flows into the St. Wolfgang See. We often walked into that very dark area. I always enjoyed going there with him, because I hoped to see a certain kind of butterfly, Eisvogel or Schillerfalter, though I never did see any. Father had told me that this is the kind of spot where you can sometimes get to see an Eisvogel. Another time, grandfather and I went to the beach together and we passed an encampment of gypsies. Grandmother had told me that if I ever met some gypsies alone I should run the other way because gypsies were known to kidnap children. From that time on, I was quite afraid of gypsies. One other time grandmother and I traveled back to Vienna alone. I think father and mother had gone off on a vacation. I remember not enjoying that trip at all, it was a very upsetting trip. I didn't like where I slept and I wet

and I wet my bed. There were just many things that bothered me on that trip.

In Vienna, I always used to call up grandmother's house, to see where the menu was better, at her house or at mine. I would first find out what there was for dinner at home, and then would go to the telephone and call up grandmother and ask her what she was making for dinner. If she made something that I preferred, I would go over to her house, which was only a few blocks away. We lived at number 64 and she lived at number 87 Taborstrasse. Very often, she would make a Naturschnitzel or something similar, and I would go over there, if I had permission. When I was there, I sometimes slept there. Grandfather used to watched me draw and helped me draw. I remember his telling people that I could draw animals better than he could, and I was very proud of that. One time, he took me to the Riesenrad, which is the Ferris wheel in the Prater. He took me on many, many walks. In fact, he used to take me to see his patients with him. Once we went to see professor Schnitzler. On one occasion he took me to see a patient, who he said had liver disease. For years thereafter, I refused to eat liver. I only started to eat liver again as an adult. He taught me many things, he told me stories, he told me things about medicine. We often went to the Cafe Schoeffel, a coffee shop which he used to go to a lot, and sometimes we went to the Schwedenbruecke, where there was another coffee shop, the Schweden Café and there we met sometimes Mr. Rosegg, the uncle of Paul, who was a friend of grandfather's, who would do tricks for me. He would for example, put a piece of paper over a glass of water, wet the edges of the glass and then light the four corners, with the result that a circle of paper would be left in the middle, as the flames would not pass the wet circle of the glass. Anyway, grandfather and I may have spent more time with him than

with any other adult at that time. Once I went for a walk with Erich Ziegler, also to the Prater, and Lisa sometimes took me on walks, but it was mostly grandfather, who spent a lot of time with me.

When we left, everybody stood in front of the house, waving good-bye, as our taxi left. Father then told me to take a good look at Vienna, because we probably would never see it again. The taxi took us to the train station. On the way I looked at everything as hard as I could, so as to remember it. One more thing I remember, when we went to the grandparents house, very often grandmother and grandfather used to quarrel and have disagreements. Grandmother always complained that grandfather ate too much bread. That was one of her big complaints. He often did not like the food she cooked and just wanted to eat bread. She complained a lot. She used to call him a "Keppler", because he criticized everything she did, and often grumbled and complained about her. He would take a knife out of a kitchen drawer, take a big loaf of bread, and cut himself a slice, just before meals and between meals, and when he did that she would get very upset with him. But , of course, none of that bothered me. There was also aunt Klemi, who often came there. She was a sister of grandfather's, an old lady with white hair, who was always sour, always complaining, always angry; I did not like her very much. She usually sat quietly in a particular easy chair while everything else went on around her.

When I arrived in the United States, I started going to elementary school the very next day, P.S.77, a school in the neighborhood of 308 Garfield Place near Prospect Park, where we lived. I did not like that school at all, it was a very difficult adjustment for me to make. First of all, I did not speak the language well, and the children were very hostile too. It was a very antisemitic neighborhood, a lower class Irish neighborhood, and my interests were not

at all appreciated or encouraged in that school. All the emphasis was placed on the fact that I was a foreigner and did not speak English well. Teachers told me that I had the wrong attitude and did not have"the American spirit". Miss Bab, the history teacher, was particularly upset that I did not know American history and geography. So, I was just continuously in difficulties. Objectively, I did not do do that badly. I did well in subjects that I was able to master like mathematics or music, but in history or geography or English, I was not really competent - Miss Bab always gave me 64 on my report cards. Some of the teachers thought that I should nonetheless be skippes, because I was probably ahead of my class in some respects. So, I was skipped and I went to eighth grade the following year, and in January 1945, I went to Abraham Lincoln High School as the result of an intervention of Mrs. Neumann, who spoke to the principal of Abraham Lincoln High School, Mr. Mason, to accept me on an exceptional basis. So, he accepted me and I started at Lincoln Highschool. That was much better for me. It meant a 20 or 30 minutes trip every morning, by subways. Nonetheless, I did quite well there, I began to learn English, and started to get 85's and 90's on my tests. But, because it was so far away, I transferred to ErasmusHigh School the following semester, which was a high school in my neighborhood, my area. I started at Erasmus the following September of 1945. There, I met Joe Sucher, who became a very good friend of mine. As I learned English, I did better and better in my school work. I started getting 90's gradually, even though I soon stopped studying. That entire period, I spent most of my time painting and practicing the piano, which left little time for homework. I practiced the piano 3 hours every evening. When we didn't have a piano yet, I used to go to the Ethical Culture Society every night at seven and practiced on their

Steinway upright exactly till 10. On Saturdays, I had my piano lesson with professor Leon Erdstein. Then, father bought me a piano, and from then on I practiced at home. First, father bought an upright piano, when we moved to Ocean Avenue in May of 1945; I practiced on that piano for some years, and then, around 1947 or 1948 or 1949 father bought a Brambach baby grand. I continued to to spend much more time practicing the piano and painting than on school work. It was quite easy for me, and I was able to do reasonably well without putting in significant time at home.

In the summer of 1945 I went to a boyscout camp. Most of the summers we went to Fleischmanns in the Catskills, and later to Pinehill, where I always did a lot of painting. I missed my piano, as there were only old uprights there. It was actually a very boring place to be. The last summer I was in the Catskills, before entering college. I spent the entire summer learning to play chess. I went through the book of Capablanca's '100 Best Games' by Golombek and practically memorized the book. I was hoping to get on the Columbia chess team, when I entered Columbia in 1948. Well, I did get on the chess team, and spent most of my time playing chess for the following 4 years. I graduated from Erasmus Hall High School in June of 1948, having gone to high school a total of 3½ years. So, it was that last summer that I studied chess. When I entered Columbia in the fall of 1948, I began to play chess more and more seriously. After about 3½ years, I was ready to graduate and I actually graduated in June 1952. I could have graduated half a year earlier, because I alraedy had all the credits at that point. But I decided for some reason to stay another half year. I audited many courses, and I took many optional courses. I also played a lot of chess. During that period I decided that I did not want to go to medical school. I became very interested in psychology and decided

that I wanted to become a psychologist, an experimental psychologist. I applied to and was accepted by the psychology department at Columbia. At that point I gave up chess and began to devote most of my time to research in the laboratory.

That was when I met Donald Cook, who gave me my first job in the psychology department, as his research assistant. He had a research contract with the U.S. Airforce, the HFORL, which means Human Factors Operations Research Laboratory, to develop new methods of teaching Morse Codes and sequential behavior of any kind, including the information structure of English. I spent all my time on that project. I must have worked about 12 or 14 hours a day including weekends. I made a lot of money, because Don Cook paid me by the hour. I moved in with him, after about a year. The next year I got another job with Robert Berryman, who also hired me as a research assistant. I also became a research assistant for several of the professors who taught the experimental psychology course, called GS 83, which was a five point course with two hours of lecture and 6 hours of laboratory per week. Robert Berryman hired me to work on an Air Force contract to study the effects of Vitamin E on the ability of animals to resist anoxia or hypoxia. I built a rat laboratory and all the required equipment for these studies. It wsa during that project that I got my Ph.D and at the same time, in another experiment, I superstitiously conditioned a pigeon and built an apparatus that enabled me to photograph the pigeon's movements through a grid. That allowed me to analyze and graph the movements to show the stereotypy that developed as the animal became progressively more conditioned. I worked weekends and days and nights during that period of 1952 to 1956. In 1954, I got my MA-degree and in 1956 I finished my Ph-D work. In September or October of 1956, I took a full-time job at Schering Corporation. I was di-

rector of the behavior research laboratory. There I built the largest behavior laboratory in the world at that time. It was completely automated. I operated 20 animal work stations at one time, with 8 animals per station. The laboratory was so automated, that it was possible for everybody to go away for a week without interrupting the experimets. The animals were continuously fed and watered and data recorded and experiments programmed and data analyzed. And when we came back, we would find the computer-analyzed data for all the experiments that had been going on during the whole week. Each animal was tested 3 times a day. This was all done by equipment that I had designed and developed. The purpose of the laboratory was to study the effects of various drugs on behavior. Of course, it was not so automated that the drugs were given automatically. That still required a person. The collection of base line data did not require the attendance of any human being. We did experiments of compared behavior patterns in rats, monkeys and human beings in analogous experiments, and we compared the effects of drugs on monkeys, rats, and people. During that same period that I was director of the behavior research laboratory at Schering, I also continued to teach the experimental psychology course at Columbia, for which I had originally been the assistant. In 1954, I had been asked to take over one of the sections of that course, and the following year I was asked to take over two of those sections, essentially replacing the professors, whose assistant I had previously been. I continued doing that during my 4½ years at Schering. I did many dozens of research projects. I did many studies that established various behavioral effects of caffeine, metamphetamine, and methylphenidate (other stimulants). To do this, I developed and used techniques for measuring the time-esti-

mation and counting ability and performance of any animal. (See published studies). One of the important projects I did in 1957-58 was the development of a notation system for the description and behavioral contingencies. (See paper). That work was well-received by my colleagues and in subsequent years I heard that some psychology professors were teaching it to their students. In 1976 I heard of it being used in Brazil. In 1960-61 I helped Ken Weingarten apply it to sociology and economics for his Ph.D. Thesis in the Columbia sociology Department. (See Weingarten and Mechner). Toward the end of my employment at Schering, in 1961, I had data and outlines for 24 research publications. Unfortunately, the demands that my next venture (Basic Systems) placed on my time and energy made it impossible for me to complete them all. I published only another two, with Vicki's help, in 1962-63.

In 1959 I became interested in the possible practical applications of Skinner's programmed instruction idea, which Skinner published in 1958. My feeling was that machines were unnecessary, as their only function seemed to be to hide the answer before the student had committed himself. I thought that the same result could be accomplished by the use of index cards or pamphlets with the answer to each question written on the back, or omitted altogether if the program's step-by-step progressions were sufficiently easy. To test this idea, I developed a programmed algebra course for children using the modern axiomatic development of algebra. I must say that I learned a lot about algebra in the process as I had to work out the relationships among the axioms and their sequential hierarchy. I tested the program on some 8 or 9 year-old children, and encouraged friends of mine to try it on their children. The results were quite good, and I was encouraged. I went to see Don Cook who was at that time working at the National Institute of

Mental Health in Washington and showed him what I had done with programmed instruction. He arranged for me to give a seminar lecture on notation system as it applies to the analysis of social interaction to the NIMH staff. This presentation was very well received, but Don Cook was particularly excited by my programmed instruction work. Then I went to see Skinner about it, but all Skinner seemed to be interested in talking about was his own teaching machine research.

So, in 1960, I decided that I would form a company to commercialize programmed instruction in book form, and sell it to the schools. My first idea was to write all the programs myself, like an author, while continuing my employment at Schering. In the Spring, I formed Behavioral Science Applications, Inc. and offered equal stock participations to five of my collegues (all Ph.D's in psychology, Don Cook, Robert Berryman, Thom Verhave, Irv Goldberg, and Stuart Margulies). Having had no business experience at all, I assumed that with an important and practical idea like programmed instruction, it would be rather easy to make a few million dollars in half a year or so.

In the summer of 1960 I had an invitation to give a paper in Basel, Switzerland, on my work comparing the behaviral effects of stimulants in rats, monkeys, and man. (See paper in Psychopharmacology). As I had not been outside the U.S. since childhood, I decided to make this my first vacation since 1952. First I went to Paris where I stayed with cousin Lucy. I walked all over Paris for several days, especially the areas I had frequented when I lived in Paris with Lisa in 1938-39. It all seemed unchanged. Then I went to Basel where I gave my paper. From there I flew to Vienna, where I stayed with the Zimmermanns. (This had previously been arranged for me by Lisl Ziegler, Fritzi's sister when she

visited New York). Jacqui and I became good friends. The next leg of my vacation was to be a five-day tour of Italy, on which Jacqui joined me. We went to Rome, Florence, and Venice. I then went to Agai on the French Riviera where I stayed with cousin Suzanne and her husband, the Marquis de Monfort in their palacial villa on the waterfront.

Upon my return to New York, I received a call from an old Columbia friend who had studied law, David Padwa. He had been Phillip Jessup's assistant at the United Nations, and had heard from our mutual friend Don Cook that I had been working in programmed instruction. Padwa thought that we would be able to sell programmed instruction to the United Nations for use in underdeveloped countries and should go into business together with that as our plan. I quickly agreed, but there followed some difficult negotiations. It turned out that Padwa wanted to own the whole company and pay me royalty. My objective at that time was to make a lot of money so that I would be able to fund a big behavior research institute that would enable me to carry out the dozens of research studies I had on the drawing board. I found myself a lawyer, Martin Mensch, to assist me in implementing my plans. Mensch quickly explained to me that the appropriate relationship between Padwa and me would be a 50-50 division of the common stock of the new company, not a royalty. When I presented this to Padwa he blew his top and we almost broke up the deal. I stood firm and said that I could just as easily proceed without him and do the same thing through Behavioral Science Applications. So Padwa accepted my terms which included a royalty to BSA for the behavior research Institute. We incorporated the firm in September of 1960 and called it Basic Systems Inc. Padwa put in the first $5,000 and I think my father put in about $4,000 some time later.

One of my first moves was to speak to the training director at Schering about the potential of programmed instruction for training of the pharmaceutical detailmen in the medical background of the products they sell to doctors. He gave Basic Systems a $6,000 contract to develop such a course, and we agreed to do an experiment comparing the effectiveness of programmed instruction to conventional instruction. I wrote the program in a few weekends, (it later became a widely used model in the field) and the study showed the detailmen trained by the program averaging scores of about 91% after 10 hours of programmed learning, while the control group got abysmally low scores. This study was widely published and quoted in the following six years. I got another contract with Schering during that winter, this one from the medical department. My suggestion was to develop programmed instruction courses to teach doctors difficult topics as a form of post-graduate medical education, to be offered by Schering as a form of promotion. The contract was for $2,500 and I wrote the program Diagnosing Myocardial Infarction by electrocardiogram in a couple of weekends. The program was extremely well put together and effective. In fact, it was used in various programmed instruction research studies in the following few years. Basic Systems continued to use it as a promotion piece, for which it was quite effective as it could be completed in about one hour by anyone, doctor or not, and could teach anyone to diagnose myocardial damage (ischemia, injury, or infarction) by means of the lead 1 tracing of the electrocardiogram. These two Schering programs were important because they represented the first efforts ever to use programmed instruction to teach practical skills to adults. Their significance to me lay in in the experience I gleaned from them. While designing and writing them, I was inventing the methodology for developing effective pro-

grams. From October 1960 to March 1961, I hired and trained about 30 of the best Columbia College math majors, physics majors, chemistry majors, and some others, to write programmed instruction courses for elementary school. My assumption was that these students were as bright and capable as adult professionals, and more receptive and accepting of new methods and ideas. I knew that I would be able to get enormous investments of time and efforts from them for relatively low pay, while their knowledge of the subject matter was more than ample for the levels of the courses we were developing. I met with each of these kids for about one hour per week, in the evening or on a weekend, going over his work and instructing him in the technology and techniques of programmed instruction. My appointments would start at 7:00 PM every evening and continue until 11:00. Between programmers, I would write little theoretical papers on the technology of program construction, which I was inventing through my work with the kids. In November I rented a room in a building on Broadway and 112th Street and got a secretary to help me with the scheduling and typing. In the middle of that period, Padwa persuaded me to take Barrie Simmons into the company and give him a 15% stock participation. I was against it but acceded under pressure from Padwa. Simmons was 23 years old, a graduate like Padwa from the University of Chicago, brilliant, crazy, an art collector, writer, political activist and oriental scholar. He weighed close to 300 pounds, was completely bald, and had a red beard.

During the winter of 1960-61 word of my activities had begun to spread and I was frequently contacted by people who wanted to become associated with Basic Systems. One of these calls was from Charles Walther of Appleton Century Crofts which was then a subsidiary of Meredith Publishing Company. He said that he had heard of me

through Skinner and Fred Keller of Columbia and wanted to explore the possibility of publishing the programmed instruction courses I was developing. We began to negotiate, had meetings with the president of Appleton, Alan Ferrin, and eventually agreed on an investment, ~~by~~ with Meredith having the publishing rights for all our academic programs. In addition, Basic Systems was to receive a 20% royalty on the sales of programs by Meredith.

Sometime in March of 1971, I was invited to give a lecture on programmed instruction at Teacher's College, Columbia University, on the same program that featured a lecture by B.F. Skinner. Charles Atkinson was in the audience and he came up to me after my talk saying that he wanted to invest in my company. I sent him downtown to see Padwa and Simmons, which he did. I joined them about an hour later, by which time they had already agreed on an investment of $30,000 for 2% of the company. That provided us with immediate capital and eased our cash pressure.

Also in March, I asked my programmers to bring around job candidates as potential editors of the programs we were developing. One of my programmers for math, Jordan Rosenberg, offered to introduce me to Vicki Weitzberg whom he described as the brightest girl he had ever known - valedictorian from the Rockaway High School now at Swarthmore. He brought her to my office during the Spring vacation, and we left it that she would call me again at the end of the school semester. She did, I hired her, and the rest is history.

In April I decided that I could not continue to do justice both to Schering and Basic Systems, so I left Schering for full-time work at Basic Systems which was now in a position to pay me a salary. My chief assistant and associate at Schering Arthur Snapper took over my job there as head of the laboratory.

In June we moved the offices of Basic Systems across the street

to 113th Street and Broadway over a bank where we had 4,000 square feet of space. It turned out that we could get substantial contracts from industry. We got a $40,000 contract from IBM to develop a course in Functional Wiring Principles, from AT&T to develop a training program for their WATS salesmen, and numerous contracts with other pharmaceutical companies to develop detailmen training programs. We also signed a contract with the DuPont Company, at the corporate level to jointly develop many programmed courses that Basic Systems would market with a royalty paid to DuPont.

I persuaded Don Cook to join Basic Systems on a full-time basis for a 4% equity participation, and Don Bullock, Stuart Margulies, and Irv Goldberg each for about 2%. Later we brought in Gene Keluche from the Harvard Business School (I was more against than for hiring Keluche, but again Padwa and Simmons were very insistent). Later Keluche brought in John Murphy, also from the Harvard Business School and Ronald A. Richards as manager of the Chicago Region. My main function was selling new contracts, designing the required programs, hiring and training the programmers, and developing the technology. The Pfizer contract, which was for $250,000, resulted in my development of Effective Listening and Professional Selling Skills, which became very important Basic Systems products and are still today Xerox Learning System' most important products.

The programs that Basic Systems developed during the years 1961-64 were some of the best programs ever developed up to that time and were widely used as models. Basic Systems had an excellent reputation both for the quality of its products and the competence of its people. We not only had all the best people in the field, but had created an environment in which rapid technological progress and innovation could occur.

insert after p. 41

Learning by Doing through PROGRAMMED INSTRUCTION

Programmed instruction can be compared with the tutorial method of teaching in which there is an exchange between the tutor and his student and a constant introduction of new material as the student masters the previous material.

But, in programmed instruction there need not be a teacher. The exchange usually takes place between the learner and the material which is arranged in steps of gradually increasing complexity—each one boxed in a "frame"—so that the learner can easily proceed from what he knows to new and more complex materials. Each learner's response and his rate of progress is an individual affair; his responses are not conditioned or determined by the responses of others.

Programmed instruction has been used in elementary schools, high schools, nursing schools, colleges, and in industry. It has proved to be adaptable for various kinds of adult education. It is a teaching technique which holds great promise for the future—a technique which seems to be particularly useful for continuing education. This article describes programmed instruction, gives several examples—one in physiology—and indicates some of its uses.

FRANCIS MECHNER

The application of behavioral science to various problems in education has resulted in some startling innovations. One of these is the self-teaching technique called programmed instruction. Through specially designed programmed texts, physicians are keeping up with new developments in medicine; unskilled industrial personnel are learning how to operate complex equipment; trigonometry students are learning to do logarithms; illiterates are being taught to read and write; and detail men are learning to explain the chemical structure and clinical use of new drugs.

Basically, programmed instruction involves the application of theories of learning to practical problems of education. Thorndike at Columbia and Watson at Johns Hopkins first suggested that the findings of experimental psychologists should be applied to educational practice; Hull at Yale formulated a theory of concept formation in 1920 which proved to be extremely important, but it was Skinner at Harvard who laid most of the scientific groundwork for the development of behavioral technology. The past five years have seen a remarkable burgeoning of interest in this new technology, and the use of programmed instruction in a wide variety of fields has resulted in more rapid and more complete learning than was achieved by other methods of instruction, often with difficult, technical material.

As the technology of programmed instruction evolved and matured, a variety of methods and techniques have developed. Obviously, postgraduate medical education programs will look very different from programs designed for elementary school children, and both of these will look different from programs designed to teach people how to listen more effectively. However, they all have certain characteristics in common.

A very simple example follows. By doing the items at the top of the next page, you can teach yourself, in about two minutes, how to square, mentally, any number ending in five. Be sure you always write in your own answer before looking at the correct answer, shown in the right hand column. Cover the correct answer with a piece of paper until you have written in your own answer.

DR. MECHNER (Ph.D., Columbia University, New York, N.Y.) is director of research at Basic Systems, Incorporated, New York, N.Y. and is a consultant in behavioral technology to UNESCO.

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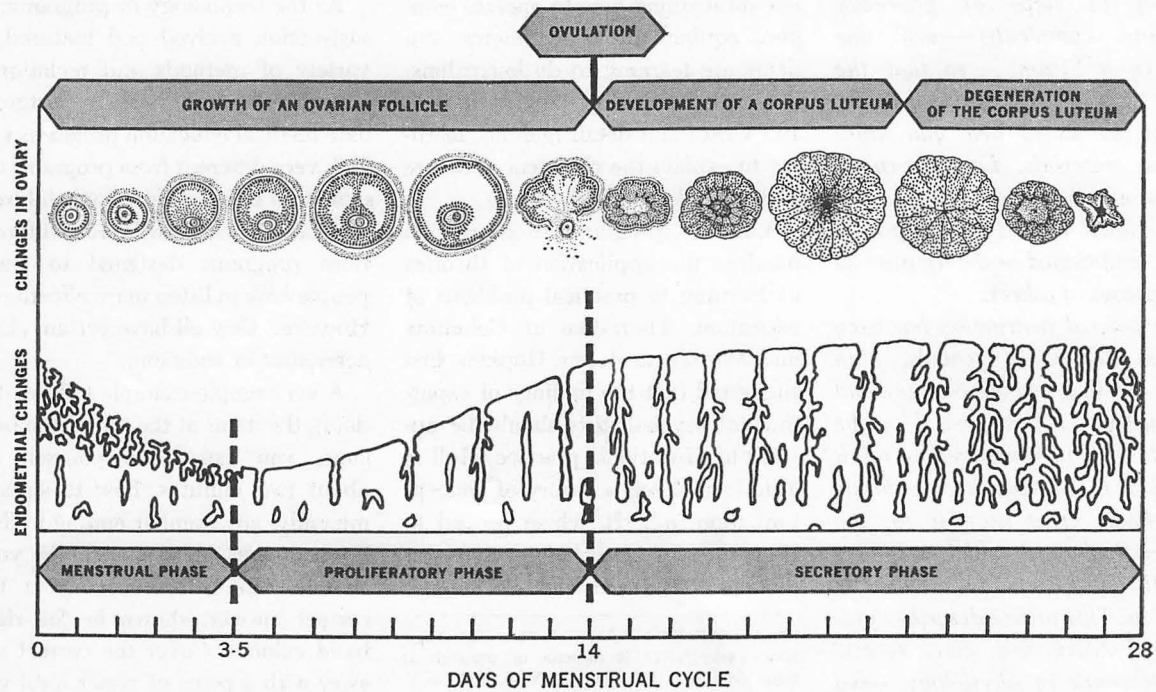
QUESTIONS	ANSWERS
1. Here is how you can square 15: 15 lies between 10 and 20 10 × 20 =_____ 200 + 25 =_____	200 225
2. Here is how you square 35: 35 lies between 30 and_____ 30 × 40 =_____ 1200 + 25 =_____	40 1200 1225
3. Here is how you square 65: 65 lies between_____ and_____ _____× 70 =_____ _____+ 25 =_____	60 and 70 60 × 70 = 4200 4200 + 25 = 4225

QUESTIONS	ANSWERS
4. Here is how you square 45: 45 lies between . . . _____×_____=_____ _____+_____=_____	40 × 50 = 2000 2000 + 25 = 2025
5. Here is how you square 25: 25 lies between . . . _____×_____=_____ Finish the example, mentally:_____	20 × 30 = 600 (600 + 25) 625
6. Here is how you square 75: 75 lies between . . . _____	(70 × 80 = 5600 5600 + 25) = 5625
7. Square 55, mentally._____	3025
8. Square 85, mentally.	7225

Another example of programmed instruction are the following excerpts from an already published program. Panel 3 (below) is referred to in the frames on the next two pages.

PANEL 3

Ovarian and Endometrial Activity During the Menstrual Cycle



5

TURN TO PANEL 3

Panel 3 depicts the sequence of events in the ovary and endometrium during the menstrual cycle.

What structure is present in the ovary:

following ovulation? _____
prior to ovulation? _____

corpus luteum
(ovarian) follicle

What is the phase of endometrial development:

during the menses? _____
following ovulation? _____
immediately prior to ovulation? _____

menstrual phase
secretory phase
proliferatory phase

What is the phase of endometrial development when a fertilized ovum could be present for implantation? _____

secretory phase

6

REFER TO PANEL 3

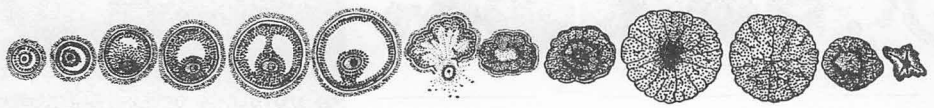
As the panel indicates, development of a corpus luteum within the ovary is followed by _____.

degeneration of
the corpus luteum

7

DO NOT REFER TO PANEL 3

LABEL the last step of the following sequence of events occurring within the ovary during the menstrual cycle:



GROWTH OF AN OVARIAN FOLLICLE → OVULATION → DEVELOPMENT OF A CORPUS LUTEUM → _____

→ DEGENERATION OF
THE CORPUS LUTEUM

8

REFER TO PANEL 3

Within the ovary, the event that follows ovulation is _____.

development of
a corpus luteum

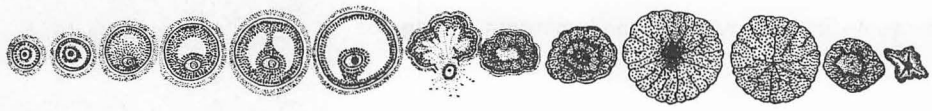
The final phase in the development of the endometrium during the menstrual cycle is the _____.

secretory phase

9

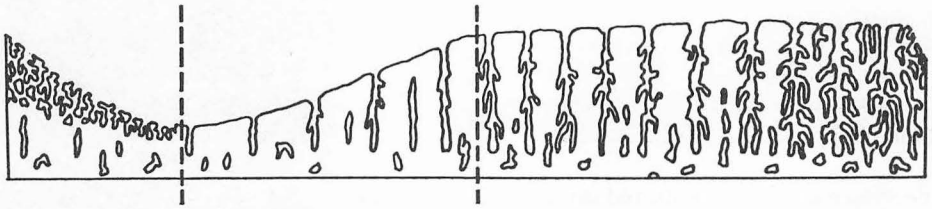
DO NOT REFER TO PANEL 3

LABEL the missing steps in the following diagrams to indicate the sequence of events within the ovary and in the endometrium:



GROWTH OF AN OVARIAN FOLLICLE → OVULATION → _____ → _____

→ DEVELOPMENT OF A CORPUS LUTEUM → DEGENERATION OF THE CORPUS LUTEUM



MENSTRUAL PHASE → PROLIFERATORY PHASE → _____

→ SECRETORY PHASE

10

REFER TO PANEL 3

What event within the ovary follows growth of an ovarian follicle? _____

ovulation

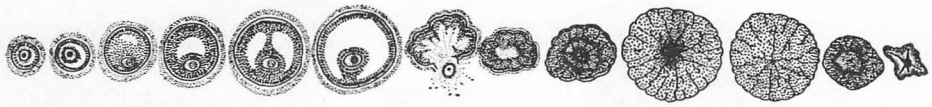
In the endometrium, the phase that follows the menstrual phase is the _____.

proliferatory phase

11

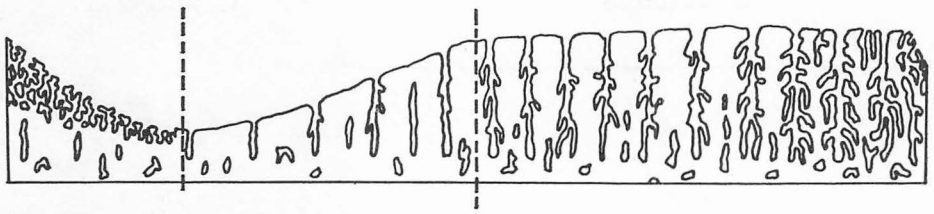
DO NOT REFER TO PANEL 3

LABEL the missing steps in the following diagrams to indicate the sequence of events within the ovary and in the endometrium:



GROWTH OF AN OVARIAN FOLLICLE → _____ → _____ → _____

→ OVULATION → DEVELOPMENT OF A CORPUS LUTEUM → DEGENERATION OF THE CORPUS LUTEUM



MENSTRUAL PHASE → _____ → _____

→ PROLIFERATORY PHASE → SECRETORY PHASE

When the learner has completed the above frames and frames 12 through 21 (not included with these excerpts), he should be able to complete correctly test frames 22 and 23, shown on the next page.

22

CHECK the phase(s) through which the endometrium passes while the corpus luteum is present in the ovary:

- ☐ the menstrual phase
- ☐ the proliferatory phase
- ☐ the secretory phase

the secretory phase

23

MATCH each of the following stages of ovarian activity with the phase(s) of the endometrium that correspond(s) to it in time:

A. onset of menstrual phase
B. during menstrual phase
C. end of menstrual phase
D. onset of proliferatory phase
E. during proliferatory phase
F. end of proliferatory phase
G. onset of secretory phase
H. during secretory phase
I. end of secretory phase

1. _____ degeneration of corpus luteum
2. _____ follicle reaches maturity
3. _____ onset of follicle growth
4. _____ onset of growth of corpus luteum
5. _____ ovulation
6. _____ period during which corpus luteum is present
7. _____ period of follicle growth

1. I
2. F
3. A
4. G
5. F, G
6. G, H, I
7. A, B, C, D, E, F

As can be seen from these examples, the main features of programmed instruction are:

1. Step-by-step progression in complexity of material. Each step is a question or problem to which the student must make an active response before he can proceed. Because each step builds upon the knowledge taught in the previous steps, the student is never required to answer a question about a subject until he has learned the answer to it.

2. At each learning step, the student is required to make an active response. He is not the passive recipient of information; rather, he exercises and practices his knowledge and skill as he acquires it. He "learns by doing."

3. As soon as the student has made his response to an item, he can find the correct answer which is normally shown alongside the question. In this way the student is reassured that he is progressing satisfactorily.

Different learners will progress through a program at different rates. In a group of thirty, the fastest learner may progress three times as fast as the slowest learner. With programmed instruction, the fast learner is not held back by the slow one, and the slow learner is not left behind in a state of helplessness and confusion. Also, learners who might be embarrassed to demonstrate their ignorance or show their failure to understand in front of other persons can be "stupid" in private. When he is taking a program, a learner can go at his own pace and make "silly" mistakes without anyone else knowing about it.

The variety of programming methods and techniques currently in use are due to the varying requirements of different types of subject matter as well as to the differences in learner groups. Programs intended for children in the lower grades use shorter frames and smaller step sizes than those intended for children in higher grades. Programs in advanced areas, such as post graduate medical education, have frames which are sometimes an entire page in length, and which assume considerable prior knowledge on the part of the learner. When the learner group is particularly heterogeneous, various branching devices, such as express stops, may be used. An express stop is a self-diagnostic frame, in which the learner is told that if he is able to answer a particular question, he may skip ahead to a specified point, but if he is unable to answer it, he should proceed to the next frame. This is just one of several devices used to accommodate individual differences.

Not all programmed instruction uses the paper-and-pencil response mode. The response mode must always be related to the type of behavior being taught. For example, if the behavior to be learned is a conversational skill, then the program must require spoken responses. If the behavior to be learned is typing, then the responses must be made on a typewriter. Some programs in industry use the audio-lingual mode to teach interpersonal skills, such as interview skills. In an audio-lingual program, the learner hears his instructions and hears sample conversational exchanges on a magnetic tape or a record. He makes his responses orally, or by selecting an answer from several possible answers in a special response booklet.

In the early days of programmed instruction, a great deal of attention was focused on teaching machines. A teaching machine is primarily a device which exposes only one frame of the program to the learner at a time. When the learner has responded, he then is able to advance

to the next frame by pushing a knob or button. The main advantage of a teaching machine is that it prevents "cheating"—peeking at the answer before having made the response—and unauthorized looking back at previous frames. But, machines are expensive, can break down, are difficult to move or carry around, tend to slow down the student, and restrict the range of programming techniques that can be used. The trend in the past few years has been away from teaching machines and toward programmed text presentations, illustrated by the samples in this article. When the technical problems are solved and when costs are reduced, it is quite possible that this trend will be reversed, but this is not likely in the very near future.

Although programmed instruction has not yet achieved the same degree of success in the school system that it has achieved in postgraduate education and in industrial training, there is every indication that it will eventually be used to a greater extent in the classroom, especially if good programs become available, and teachers learn to select and use them.

There is certainly no lack of interest in this new technology among teachers. With some, this interest arouses hope and expectation; with others, anxiety. Some teachers have voiced the fear that they may be replaced by programmed instruction, this fear is quite unjustified. Some teachers have assigned programmed instruction as homework. Other teachers have used programs to help the class learn the basic subject matter, and then have used the remaining classroom time for discussion, questions, and exchange of ideas. It has frequently been said that programmed instruction can take much of the drudgery out of teaching: grading homework is eliminated because programs do not need to be graded. Tests and examinations become comparatively less important, because students who have completed a program can be counted on to have achieved the required levels of knowledge. Professionally developed programs usually will produce median final examination scores of 90 percent, or better. Only those students who have not taken the program can fail the final examination.

PRODUCING A PROGRAM

As in any other technology, the production of effective materials requires the collaboration of a team of specialists.

Before a program can be prepared, the behavioral changes that the program is expected to produce must be described in detail. Programmers do not talk about what the learner should "understand" or "know" or "be familiar with." They talk about what the learner should be able *to do* after having completed the course that he could not do before: the questions he should be able to answer, the problems he should be able to solve, the explanations he should be able to give, the diagrams he should be able to draw, and the kinds of responses he should be able to make in given situations. These are all examples of behavior. Once the behavioral outcomes are known, production of the program can begin.

The initial step in the production process is called "task analysis." This is the identification and description of the tasks which the student must learn to perform in order to do his job or carry out the objective established for the program.

Task analysis requires the collaboration of subject matter experts and behavioral psychologists. The subject matter experts must be familiar with the problems of the occupation for which the learner is being trained, and must be able to identify the individual tasks that must be learned. The psychologist (or "behavioral technologist") then insures that the description of these tasks is specific, operational, and behavioral. He must be sure that the tasks are specified in terms of the situations that arise in practice, and in terms of the responses which the learner is expected to make in these situations.

The task analysis approach to planning the teaching of subject matter will yield a syllabus which will be different from that which other approaches might yield. For example, if one approached the development of a syllabus for a nursing course with such questions as, "What topics should a nurse study?" or "How much physiology does a nurse need to know?", the syllabus would be different from one developed by asking, "What are the situations and problems which a nurse encounters and how should she cope with them?" This latter approach is the one taken by the behavioral technologist in carrying out a task analysis. However, this does not mean that theoretical background knowledge is neglected. When the behavioral technologist analyzes the decisions and judgments a nurse must make in order to cope successfully with any particular situation, he quickly discovers that the nurse needs theoretical background knowledge although many of the skills she uses are practical ones. The behavioral technologist carrying out a task analysis works back from the tasks, which he and the subject matter expert have identified, to the background material which must be mastered in order to enable the nurse to cope with the tasks successfully.

One significant finding in a series of task analyses carried out in nursing is that among the nurse's most critical skills are those of an interpersonal nature. The nurse spends more time with the hospitalized patient than any other professional worker, and the patient often develops an emotional as well as physical dependence upon her. To some extent, the nurse assumes some of the functions normally fulfilled by the patient's family. It is not enough to say that a nurse must have sensitivity, understanding, perception and the ability to use herself in her interaction with the patient. These are skills that she can acquire systematically. In programmed instruction it is the task analyst's responsibility to work with the subject matter expert to identify, define, and analyze the specific behavior needed by a nurse in given situations so that she may then be taught some of the necessary interpersonal skills.

Once the task analysis has been completed, we know in general what should be taught in the course. The next step is to describe these tasks

in such a way that we can use the descriptions, known as specifications, as a test of whether or not a learner has acquired the desired knowledge when he has completed the program being developed. The emphasis is upon behavior and the conditions under which this behavior is to occur. The questions the learner should be able to answer, the problems he should be able to solve, and the situations with which he should be able to cope after having completed the course become the specifications of behavioral objectives. Examples of specifications of behavioral objectives are frame 7 on page 100, and frames 22 and 23 on page 102.

Next, the behavioral technologist examines these objectives and dissects them into their most minute behavioral components. He breaks them down into categories and classifications that make sense from a teaching standpoint. The behavioral technologist works in collaboration with the subject matter experts. He needs the answers to detailed, specific questions from someone who knows the subject matter thoroughly. He may ask such questions as "What are some examples of concept X?" "Will the student confuse concept X with another superficially similar concept?" By asking questions of this type the behavioral technologist obtains lists of examples and "non-examples," which can later be used in the concept formation process. When the learner later learns that a, b, c, and d are all examples of concept X, and that e, f, g, and h, though they look like cases of X, are not cases of X at all (non-examples), but rather cases of Y, the psychologist says that the student is learning the concepts X and Y. During the process of analyzing the desired behavior, the behavioral technologist also asks such questions as "What is the first question the student should ask himself when confronted with problem Z?", and "What are the detailed steps of the reasoning process which the student should follow when trying to solve Z?" The term "problem" is used here in a broad sense; it could be an interpersonal situation, a clinical situation, or an ordinary stoichiometry problem. The behavioral technologist works out the precise steps to be used, and later teaches these steps through a self-instruction program. One example of teaching a series of thought steps is provided by the little arithmetic illustration on page 99.

THE TEACHING SEQUENCES

Once the behavioral objectives of the course have been specified, and the behavioral analysis has been completed, step-by-step instructional sequences, known as frames, can be developed. After the frames are prepared, the program is tested with learners who are typical members of the target population for whom the program is intended. Invariably, some parts of the test program will be too easy, other parts too difficult, and many parts just confusing.

The responses and reactions of the testing group are used as a basis for revision. The revised version then is tested on another group of the typical learners. Again, the program is revised according to the test results. Usually three or four cycles of testing and revision are needed before a program is considered complete.

Professional programming groups generally demand that a finished program enable learners who have completed the program to score 90 percent, or better, on a final examination which covers the material taught in the program. Through repeated testing and revision, most of the rough spots in the program are eliminated. But it is not until the program meets the original specifications, and until most learners in the test groups are able to complete the program without ever being confused or getting stuck, that the program is released.

This is a simplified view of the production process. In practice, the process is quite intricate. Many specialized skills—the main determinants of the quality of the final product—are brought into play. The difference, therefore, between programs produced by experts and those produced by amateurs, particularly those who work alone and often do not have the advantage of consulting professional persons with many skills, is great indeed. These differences show up not only in the teaching effectiveness of the program, but also in the acceptability of the program to the learners. If a program is expertly produced, a target group of learners should be able to complete it with relatively little effort and pain, and attain a median score of 90 percent, or better, on a final examination.

Can a program be evaluated short of testing it on a selected group of learners? A practical, but not really satisfactory way to examine and evaluate a program is to take the program. If the program quickly becomes tedious, boring, confusing, or irritating, the chances are that something is wrong with it. Many programs require trivial or inconsequential responses from the learner, wasting his time and irritating him—the most common symptoms of inadequate behavioral analysis. If the program is confusing or ambiguous in spots, the program probably was not subjected to enough testing and revision. However, the evaluator may find the program too easy or trivial because it was intended for a target population with less knowledge; the evaluator simply knows too much. The only really valid way to evaluate a program is to try it out on members of the target population for whom the program was designed.

Programmed instruction may well have a significant impact upon nursing education during the next decade. Already, programmed texts for nurses are appearing with increasing frequency. Not all of these are good programs. But until nurses, as consumers of programs, are informed, discriminating, selective, and demanding, the characteristics and quality of the programs which are offered will continue to be uneven.

Like every other professional group today, nurses face an information explosion and must find ways to keep up with the accelerating pace of new developments. Against this background, programmed instruction holds considerable promise as an efficient, convenient, and accessible method of continuing education.

Interpreting the EKG

Programmed Instruction in Electrocardiography

By Louis F. Bishop, M.D.*

By answering the twelve items seen below, you can teach yourself how to read an electrocardiogram and diagnose anterior myocardial infarction. This method of learning is called programmed (or self) instruction. It is an application of modern learning theory developed by psychologists at Harvard and Columbia Universities. You should be able to finish this learning sequence in three to seven minutes.

BEGIN HERE

Do not look at answer (directly below) until you have completed Frame 1.

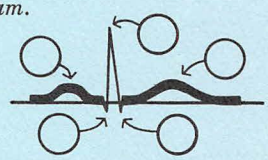
1

The diagram below, taken from the Lead 1 tracing of a normal subject, shows the standard deflections of the electrocardiogram.

Label the five deflections, using the conventional letters P, Q, R, S, and T:

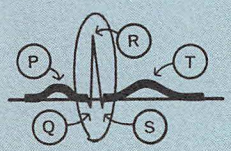
Circle the QRS complex.

The T wave is ☐ positive ☐ negative



see answer

1

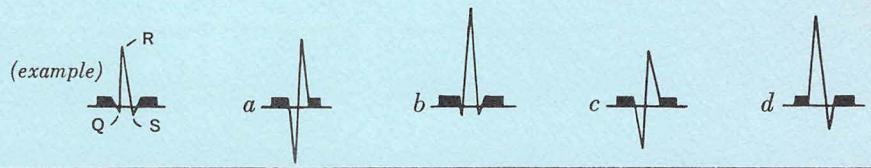


positive

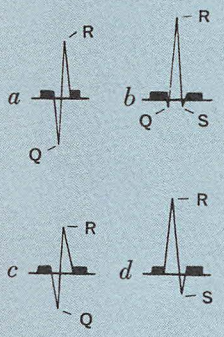
2

The Q, R, and S waves are defined as follows:
The Q wave is the negative (downward) deflection which initiates the QRS complex.
The R wave is the positive (upward) deflection of the QRS complex.
The S wave is the negative deflection immediately following the R wave.

In each QRS complex below, label the Q, R, and S waves if they are present:



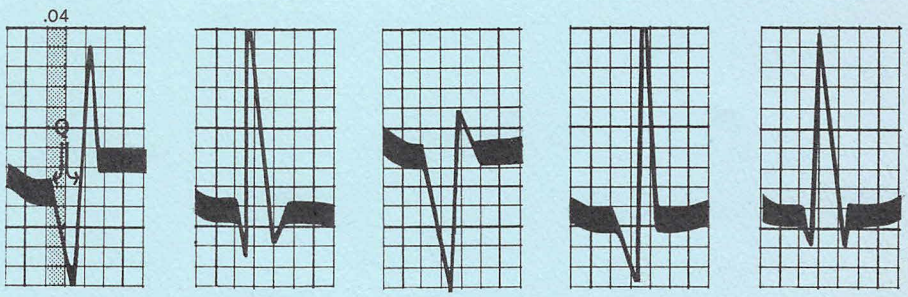
2



3

A Q wave wider than one standard division, i.e., longer than 0.04 second in duration, is considered abnormal.

Under each diagram, indicate whether the Q wave is normal or abnormal:



a	b	c	d	e
☐ normal	☐ normal	☐ normal	☐ normal	☐ normal
☐ abnormal	☐ abnormal	☐ abnormal	☐ abnormal	☐ abnormal

*Dr. Bishop is a past President of the American College of Cardiology, Historian and past President of the American Therapeutic Society, a Fellow and Life Member of the American College of Physicians, and Visiting Physician at Bellevue Hospital Center.

The approach taken in this presentation is deliberately accelerated and simplified for purposes of illustration.

3

a abnormal
b normal
c abnormal
d abnormal
e normal

4

The S-T segment begins at the end of the QRS complex and ends at the beginning of the T wave. An elevated S-T segment is abnormal.

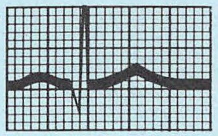
For each diagram below, indicate whether the S-T segment is normal or abnormal:

a S-T segment elevated

☐ normal
☐ abnormal

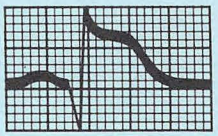
b S-T segment isoelectric

☐ normal
☐ abnormal



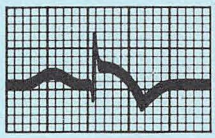
c S-T segment ☐ elevated ☐ isoelectric

☐ normal
☐ abnormal



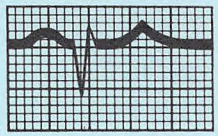
d S-T segment ☐ elevated ☐ isoelectric

☐ normal
☐ abnormal



e S-T segment ☐ elevated ☐ isoelectric

☐ normal
☐ abnormal



4

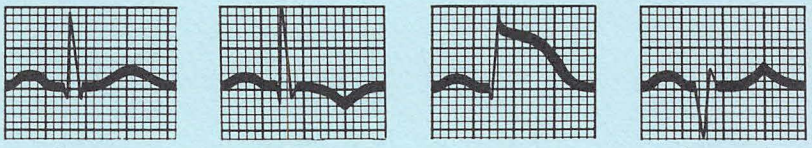
a abnormal
b normal
c elevated abnormal
d elevated abnormal
e isoelectric normal

5

Referring to the diagrams in the panel below, check the correct box:

a. An elevated S-T segment suggests . . . ☐ ischemia ☐ injury ☐ infarction.
b. A negative T wave suggests . . . . . ☐ ischemia ☐ injury ☐ infarction.
c. An abnormally wide Q wave suggests ☐ ischemia ☐ injury ☐ infarction.

These diagrams show the ECG changes which, in various combinations, may be observed in myocardial infarction.



5

a injury
b ischemia
c infarction

6

Again referring to the above diagrams, check the correct box:

a. The difference between the pattern of infarction and the normal pattern is the
☐ negative T wave ☐ elevated S-T segment ☐ abnormally wide Q wave

b. The difference between the pattern of injury and the normal pattern is the
☐ negative T wave ☐ elevated S-T segment ☐ abnormally wide Q wave

c. The difference between the pattern of ischemia and the normal pattern is the
☐ negative T wave ☐ elevated S-T segment ☐ abnormally wide Q wave

6

a abnormally wide Q wave

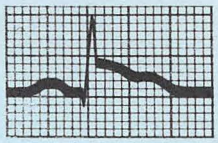
b elevated S-T segment

c negative T wave

7

The difference between this diagram and the normal pattern is the ☐ negative T wave ☐ elevated S-T segment ☐ abnormally wide Q wave

It suggests ☐ ischemia ☐ injury ☐ infarction



7

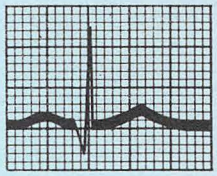
elevated S-T segment

injury

8

The difference between this diagram and the normal pattern is the ☐ negative T wave ☐ elevated S-T segment ☐ abnormally wide Q wave

It suggests ☐ ischemia ☐ injury ☐ infarction



8

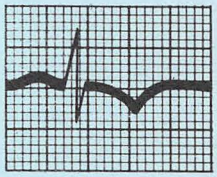
abnormally wide Q wave

infarction

9

The difference between this diagram and the normal pattern is the ☐ negative T wave ☐ elevated S-T segment ☐ abnormally wide Q wave

It suggests _____.
(write in the answer)



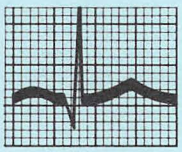
9

negative T wave

ischemia

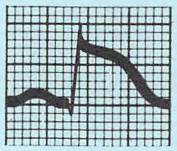
10

Check the myocardial state suggested by each diagram:



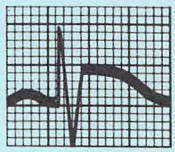
☐ ischemia ☐ injury ☐ infarction

a



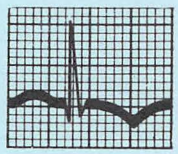
☐ ischemia ☐ injury ☐ infarction

b



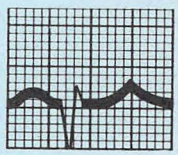
☐ ischemia ☐ injury ☐ infarction

c



☐ ischemia ☐ injury ☐ infarction

d



☐ ischemia ☐ injury ☐ infarction

e

10

a infarction

b injury

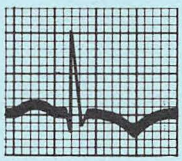
c injury

d ischemia

e infarction

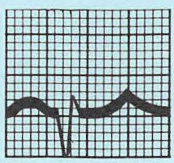
11

Check the myocardial state suggested by each diagram:



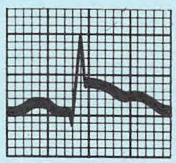
☐ ischemia ☐ injury ☐ infarction

a



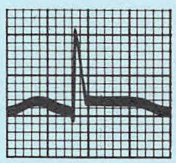
☐ ischemia ☐ injury ☐ infarction

b



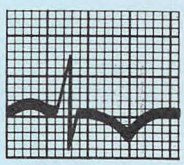
☐ ischemia ☐ injury ☐ infarction

c



☐ ischemia ☐ injury ☐ infarction

d



☐ ischemia ☐ injury ☐ infarction

e

OVER

FIRST CLASS
PERMIT NO.
217
New York, N.Y.

BUSINESS REPLY MAIL No postage stamp necessary if mailed in the United States

Postage will be paid by

BASIC SYSTEMS INCORPORATED
1 Broad Avenue
Fairview, Bergen County
New Jersey

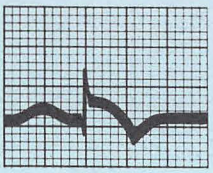
ATTENTION: MEDICAL DIVISION

11

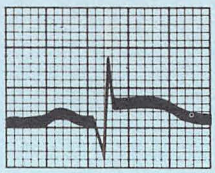
a ischemia
b infarction
c injury
d injury
e ischemia

12 *A single pattern frequently displays a combination of abnormalities.*

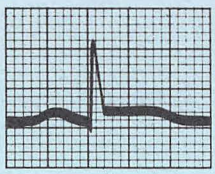
Under each diagram, check the box or boxes:



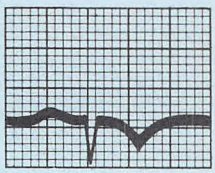
☐ ischemia
☐ injury
☐ infarction
a



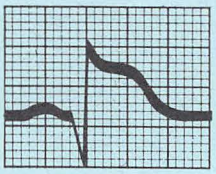
☐ ischemia
☐ injury
☐ infarction
b



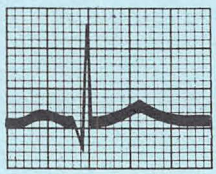
☐ ischemia
☐ injury
☐ infarction
c



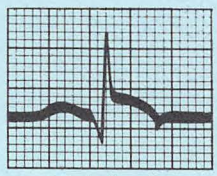
☐ ischemia
☐ injury
☐ infarction
d



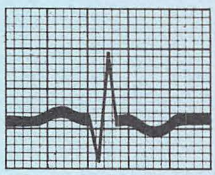
☐ ischemia
☐ injury
☐ infarction
e



☐ ischemia
☐ injury
☐ infarction
f



☐ ischemia
☐ injury
☐ infarction
g



☐ ischemia
☐ injury
☐ infarction
h

12

a ischemia, injury
b injury, infarction
c injury
d infarction, ischemia
e injury, infarction
f infarction
g infarction, injury, ischemia
h ischemia, infarction

13 Did you diagnose at least six of the above eight tracings correctly?

☐ yes ☐ no

13

If yes, then you have demonstrated how quickly and easily you can learn electrocardiography by programmed instruction.

14 Would you like to receive *without obligation* the complete programmed course in ELECTROCARDIOGRAPHY: THE ARRHYTHMIAS, which more than 21,000 physicians have already requested?

☐ yes ☐ no

14

If yes, then fill out this card, tear it off, and mail it today.

15 I have indicated below my preference for receiving *without obligation* the complete programmed course in ELECTROCARDIOGRAPHY: THE ARRHYTHMIAS, by Louis F. Bishop, M.D.

☐ Please send me a *pre-publication* copy of the complete course *now* for a ten day inspection period. During this period I may return the course for any reason without obligation. Should I elect to keep the course, you will bill me the *pre-publication price of $43.50*.

☐ *After September 1, 1694*, please send me the complete course and bill me for the *regular publication price of $60.00*.

Name _____ City and State _____

Address _____ Signature and Specialty _____

Fill out this card, tear it off, and mail it today.

In May of 1962, Vicki and I finally went on our honeymoon. I had been working 70-80 hour weeks since 1960 and had not been able to break away before. As soon as we arrived in Paris, I started a round of visits to five or six publishers including Hachette in an effort to interest them in programmed instruction for the French market. I also went to the UNESCO headquarters where I was sent to see Albert V. Baez. He was fascinated by my ideas and some months later, when I was already back in New York, invited me to become a UNESCO consultant on education. That meant working on the Brazilian programmed instruction project and later on the Bangkok project. For the Brazil project, Baez assembled 30 physics teachers from about 13 Latin American countries to spend one year in Sao Paulo Brazil. The purpose of the project was to familiarize them with new methods of physics teaching with special emphasis on the PSSC approach. I modified the project so that its objective became the production of a modern physics course on a limited topic, demonstrating the combined effectiveness of laboratory work a la PSSC, programmed instruction, and films. I o organized the 30 teachers into a production team with a project manager, one group responsible for the lab kits, another for the films, and a third for the programmed instruction. Vicki and I stayed for one whole month in Brazil, organizing the team and training the personnel. I went back once more for a two-week period about six months later. The project was quite a success, and UNESCO continued to publish and sell the course materials for many years afterwards. The following year I did something similar in Bangkok for a chemistry teaching project for Asian chemistry teachers, but that one was not as successful, partly because the participants were more rigid, partly because the project director was older and more passive, partly because the caliber of the partici-

pants was not as high, and perhaps largely because I spent only an initial two weeks without ever returning.

While Basic Systems was a brilliant success in the technological spheres, it had continual difficulties in the business area, Padwa and Simmons and no financial discipline whatever. They undertook projects and expenditures on impulse without attention to cost. They reinforced each other's promotional inspirations, which were frequent, and proceeded on the basis that future sales or additional financings would pay for all deficits that were incurred. One of my (and my professional colleagues') continuing sources of conflict with Padwa and Simmons was their lack of belief in the scientific basis and technical validity of the work we were doing. They viewed my work more as a successful promotion than a valid technological advance. We had hired Henry Meininger as our controller, but he was too weak to harness and control the company's expenditures. Simmons brought in one friend after another as supposed executives of various types - John Tarburton, Willard Baldwin - who he thought would round out the company's promotional appearance and image because they were gray-haired and WASP. In spite of rapidly increasing sales, Basic Systems repeatedly ran out of money, and each time, for three more rounds, we raised about $200,000 per round, always for about $20 per share, the same price Meredith had paid. Our investors were Morgan, Midland, Scudder, and Atkinson's family. At one point my father bought $20,000 worth of stock at $20 per share from Padwa personally. From beginning to end, Basic Systems went through about $1.000,000 of capital. By the time we reached our peak in 1964-65, we were doing a volume of about $1,000,000 per year and had about 120 employees.

Among our customers was Xerox Corporation for whom we developed

the training programs they needed for the launching of their revolutionary new 914 copier in 1964. Xerox was growing explosively during that period and was planning to expand into the field of education. They had commissioned a study on the industry and the companies they might acquire, and predictably, Basic Systems came out on top. Since they had also had experience with us as supplier, they made us an offer of $30 per share. I personally was reluctant to sell out rather than continue building Basic Systems independently, but my colleages were all eager to sell. They thought that it would be difficult to raise additional money to finance our deficits, and I agreed but proposed that we solve the problem by cutting away the fat (including the executives who kept incurring the expenditures that produced the deficits) and continue to operate Basic Systems on a profitable basis by retaining only the profitable operations. But my colleagues prevailed and we agreed on a price of $33 per share in Xerox stock. The sale was closed in 1965 and several of us were instant millionaires. My stock was worth about $1.2 million at the time of the closing, and $2.6 million when I sold it about a year and a half later. Joe Wilson said that he was buying Basic Systems because it had the best brains in the industry.

After the acquisition, Xerox mismanaged Basic Systems quite badly. They sent in a continuing relay of middle level managers, mostly previous Xerox machine salesmen, to run Basic Systems. None of them understood what had made Basic Systems tick, nor how the educational technology market was developing. Our key people left one after the other, largely unnoticed. In most cases, the Xerox business men were relieved to see "academic kooks" go, because they couldn't relate to them or comprehend their work. They did not understand how service contracts to develop training systems for companies or government agencies under contract, was a way to deve-

lop potential generic products and new technology. I made a number of proposals that I thought could provide new business approaches (these proposals later turned into Media Medica, UEC, and STACKS) but I rceived no response. Bullock went to Sweden, I stood aside while the would-be managers struggled with each other for control of operations, and Stuart Margulies gradually faded out of the picture. That removed the contributions of the three individuals who had previously designed new products and innovated. Lauren Resnick and I continued to work together developing some ideas I had been evolving on behavioral analysis, but that was not in the mainstream of what was needed. When I had been unable to elicit responses to my proposals by May of 1966, I announced that I would leave. Joe Wilson and the Xerox management were quite upset by this announcement, but I satisfied them when I said that whatever they wanted and expected from me, I would be able to do more effectively outside than inside the company. Upon my departure, I signed a $ $600,000 R&D contract with Xerox under which I was committed to developing some specified products for them through Behavioral Science Applications, Inc. in the fields of verbal skills, arithmetic, and early learning.

My contract with Xerox was very frustrating because Xerox kept reorganizing Basic Systems (by that time Xerox Learning Systems), and they seemed to have no plan or intention to publish what I was developing. Eventually, when they announced that they were withdrawing from the school market and limiting themselves to the adult market, early in 1968, I renogotiated the contract with them and in effect acquired the rights to everything I had developed for them. That included the pre-school materials that became the basis for Universal Education Corporation.

In 1966 I launched several new ventures. One was a 50-50 owned new venture with Eugene Leonard, the engineer who had built my computerized data analysis systems at Schering six years before, when he was launching Digitronics Corporation. He had sold Digitronics to North American Phillips on not-too-good terms, and wanted a good business partner. I provided the initial funding along with some contracts from BSA to develop the devices required by my contract with Xerox. Gene pulled in some engineer friends of his and soon had a very fine team, headquartered in Long Island where he resided.

Gene also introduced me to Robert Shevlin who had organized Compat Corporation but needed initial funding. I introduced them to Atkinson and Hirschel Abelson (of Ladenberg Thalman & Co.) who together invested about $300,000 in Compat. For this and Gene's help Systems Resources Corporation got an equity interest in Compat. Atkinson then became the chief promoter of Compat. He brought in the Rockefellers and some other big-name investors. Compat soon had very substantial contracts from GE and Photon, and developed extremely promising products. However, the Rockefeller' representative (abetted by Gene Leonard) could not tolerate Shevlin's behavior patterns, and got rid of him. The Rockefellers then put in their own man, George Spaulding, who promptly undertook a huge expansion of the company in anticipation of a huge expansion in sales, and demanded (and got) huge infusions of new capital for this purpose. Unfortunately the recession intervened, and Compat could not get financing for the intelligent terminal systems it was pioneering and selling. The Rockefellers and Atkinson valiantly continued to raise more and more money but it was never enough and Compat was eventually sold to Data 100 Corporation on very unfavorable terms.

Some of Compat's big investors, including the Rockefellers and Citibank had a big interest in Data 100 before the sale. I had invested a total of $250,000 in Compat, but had severed my connection with Compat and resigned from the board long before the final collapse. The main reason for my resignation was disagreements and conflicts with the Rockefeller representative.

SRC, however became a big success after some difficult years. I continued to provide capital for SRC and kept it going till 1972. Then I told Gene that he had to sink or swim on his own. At that time he had the beginnings of a very fine product line, which became the Chyron character generator. Gene made a deal with his friend Lee Weissman who provided some financing and marketing assistance. A few years later, Weissman's firm CEI and SRC merged (CEI had no products or operations of its own, but was in effect a public shell) and the resulting entity was named Chyron Corporation after SRC's product. Gene eventually left Chyron as a result of disagreements with Lee Weissman, but the product line flourished and made the company extremely successful. Today the stock is sold over -the-counter and the company expects to do about $8.5 million. **As of November 1980, the public valuation of Chyron was over $20 million**

In 1966 I also launched a new venture with Fred Kantor. He was one of the young programmers I hired for Basic Systems in 1960. At that time he was an 18 year-old physics major at Columbia. For Basic Systems, he developed an excellent programmed instruction course called Applied Electricity, for which he was paid $4,000. It was one of the best programs developed by Basic Systems, and it continued to sell well for a long time.

Kantor was exceptionally brilliant and became a good friend of Vicki and mine. After I sold Basic Systems to Xerox, Kantor suggested that we become partners and form a company that would

develop his numerous inventions. I agreed and we formed 'Unified Technology Inc.' We began by going through his notebooks that contained ideas for hundreds or thousands of inventions, dating back to his elementary school years. I selcted five inventions that seemed to me to have commercial potential: A rotary thermodynamic device that Kantor thought could be used to make air conditioners with only one moving part; an X-ray microscope based on the use of a Fresnel lens; an X-ray telescope that he developed as his Ph.D. thesis; a matrix detector that could be used for making three-dimensionsl X-ray reproductions of the internal structure of organs of the body; and a sewage disposal system involving the laying of flexible water-filled ducts along river beds. I offered to pay the patenting costs, and we proceeded with a program to obtain patent protection for these inventions.

During that same period (1966) Kantor developed a violent conflict with professor Novick, his thesis advisor and sponsor at Columbia University, where Kantor was still a graduate student. He accused Prof. Novick of having stolen or taken credit for one of his inventions, the X-ray telescope. Kantor denounced Novick to his funding agency NASA, to the Dean of the Graduate Faculties, to the Chairman of the Physics Department, and to several professional publications and societies. Kantor kept Vicki and me informed on a day-by-day basis of the progress of his campaign against Prof. Novick. Little did I realize that I was being treated to a preview of what Kantor would do to me six years later. Kantor's paranoic tendencies also manifested themselves in other small ways, already at that time. He was sure that Brookhaven Laboratories, where he had worked for a summer, had stolen some of his ideas, and that the the National Science Foundation was trying to exploit him by getting

him to sign some boiler plate language on their fellowship application form. He turned down the NSF Fellowship and asked me to pay him whatever money he might have gotten from the NSF, to which I agreed.

Our plan was to organize a series of companies each of which would be dedicated to the commercial development of a related group of inventions. One company would own the X-ray devices, another the rotary thermodynamic systems, and another the flexible riverbed ducts systems. Martin Mensch drew up a contract between Kantor and me to serve as a vehicle for our basic relationship. Kantor signed this agreement after protracted negotiations between himself and Mensch in December of 1966.

The patent for the rotary thermodynamic system was issued in 1967 and Kantor and I decided at about that time that we should make a working prototype of a cooling device prior to initiating licencing efforts. Our first attempt was to have it built by SRC. Kantor estimated that it would take a few months for SRC to make a working model. Accordingly, I gave SRC a $4,000 contract to do it. Kantor claimed that SRC did not follow his plans accurately enough and that it made unauthorized changes. In any event, the model did not work. Kantor then persuaded me that the only way to make a working prototype would be to set up a laboratory under his own control. So we rented a loft at 1875 Broadway, purchased machine tools, and set up a laboratory and machine shop. Kantor hired a good machinist, an assistant engineer, and a colleague of his who was a Ph.D. from the Physics Department at Columbia. For the next five years, Kantor was never more than two or three months away from having a working model of the cooling device, based on his own forecast. But success remained elusive. The other inventions were

being developed in parallel, but were given less attention because of the tremendously greater commercial promise of the cooling inventions. Starting in 1967, Kantor received a salary of $15,000 per year. For 4 or 5 years he worked days, nights and weekends on the inventions. Kantor is a person who can never be wrong or make a mistake. Therefore, his inability to make the cooling device work was extremely painful and embarrassing to him, in spite of the fact that in this entire period he never heard from me so much as an intimation of criticism or disappointment. I was well aware of the problems of R&D programs of this sort, and continually reassured Kantor that the problems he was encountering were normal and expected.

In February or March of 1972, Kantor finally had a device that cooled at 1½ degrees below zero. He thought that without too much difficulty he could get it to cool at 15 degrees below zero, which would be adequate for cooling a small room or making ice. But the unit kept developing cracks and leaks and that was when Kantor himself cracked up. The R&D problems were not the only source of pressure on him at that time. He had a very serious conflict with his parents; he had a problem with a girl friend; and in the background, a friend of his, Wesley McCane was persuading him that I was a business flop (witness Media Medica, UEC, and Compat which were then having difficulties) whom he should drop in favor of Wesley McCane who would make a more suitable partner. McCane was an Assistant Professor of Economics at Columbia who had wanted to join my staff some years earlier, but whom I had decided not to hire when his stories about his own exploits and achievements did not check out. It was I who had originally introduced McCane to Kantor.

In any event, Kantor got McCane's lawyer to try to extricate him from his relationship with me, He began by accusing me of incompetence in managing our business relationship and of having failed to license the inventions. In 1972, however, Kantor did not yet question my entitlement in the inventions. He did resign from Unified Technology, dismantled the laboratory and took everything of value to his apartment. Within days thereafter, he suffered a ruptured apppendix and, according to his own reports, nearly died. While Kantor was in the hospital, I closed down what was left of the laboratory, took the prototypes to Chappaqua (the ones Kantor could not make work), and terminated the machinist Emanuel Nussbaum and the physicist Herbert Einbinder. These men provided me with detailed reports on Kantors erratic behavior during the preceding months, the essence of which was that Kantor had been suffering a nervous breakdown. In December of 1972 while Kantor was still in the hospital, he <u>really</u> went on the warpath. He wrote letters denouncing my alleged malfeasance to my accounting firm Leidesdorf, to my law firm Paul Weiss, to the brokerage firm Troster and Singer, to the IRS, and personally went to the Manhattan District Attorney to file a complaint against me. Immediately thereafter he went to the Wall Street Journal telling them to write a story about my nefarious business exploits which he alleged were already under investigation by the District Attorney. Unfortunately, he found a reporter at the Wall Street Journal who was sufficiently impressed to undertake the development of Kantor's version of my carreer into a major story. The reporter, Jonathan Kwitny, interviewed me and many of the people with whom I had had dealings, and took meticulous and accurate notes of everything he was told. The story he eventually published, however, does not reflect these notes and amounts to a

fictionalized account. Most of the quotations in his story were fabricated, including the ones attributed to me, usually with contradictory versions of the alleged quotations appearing in his own notes. The facts cited in the story also were amply contradicted by his own notes and records. The article as a whole depicted me as a con man, liar, and business failure. It damaged me considerably, especially in my ability to raise capital for my ventures.

When all efforts to settle the dispute with Kantor proved of no avail, I sued Kantor for my entitlement in the inventions. The problem was that the patents and rights had never been formally assigned to any particular entity. Kantor decided to act as his own attorney, and this did not help. Joel Bernstein agreed to handle the case for me, and efforts to settle it are still underway. The inventions, especially the rotary thermodynamic system, are potentially of great commercial value.

MEDIA MEDICA INC.

During my last year at Xerox, after the acquisition of Basic Systems, one of the business plans I submitted to Xerox was for a business that would develop and market patient education materials the way a pharmaceutical company markets drugs. Since Xerox never responded to the proposal, I decided to do it myself.

I left Xerox in July of 1966, and spent the summer of 1967 developing a detailed business plan for Media Medica. In August and September I approached several potential investors and found the future President and CEO for the company, Raphael Cohen. The investors were very impressed with Ray Cohen, though I had my doubts about him from the beginning. His ideas seemed somewhat grandiose and he had a perpetually quivering ego. He interpreted every event as being either in his favor or against him. I had

envisaged a very broad and inexpensive product line, while Cohen favored a more limited but very high quality and expensive product line. But the investors, including Lionel Pincus, were very much impressed with Cohen and his track record, and wanted to bet on him. So did I. The investors put in an initial $1.7 million and I put in about $100,000 of that amount.

Ray Cohen quickly assembled a Board of Directors and a Board of Advisors consisting of some of the leaders of American medicine. Each of them was offered a modest fee for being a director, and about .3% of the common stock. Cohen then hired talented medical writers and editors to produce the programs he envisaged. There was hardly a decision or issue on which his fragile ego did not get in the way. He generally viewed every occurrence in terms of its confirmation or disconfirmation of his self-image as a genius and supremely important person. Any advice I offered he rejected, not so much because of its substance, but because accepting it would have implied obeisance or less than perfect judgment on his part. There were three basic reasons why I did not urge the Diractors to replace him: One was my hope that his huge ego and enormous desire to succeed would propel him to success, in spite of all his emotional failings. A second reason was my fear that by turning on Ray Cohen I would be admitting to having made a disastrous mistake, as I had advocated hiring him at the beginning. A third reason was that if Ray Cohen went, I would have been forced to step into his place until he was replaced, with disastrous consequences for my other obligations.

The result was that the products were too slow in coming. They were of superb quality, but too few in number. Because of his egomaniacal management style, Cohen could not hold on to really

competent and creative people. He had an uncontrollable need to put his own imprint on every detail, usually in ways that were mistaken, inappropriate, or arbitrary at best. He hired and built the sales force too early, anticipating that his production schedules would be met, but they weren't. I always represented an enormous threat to his feeling of power and control, with the result that I was forced to stay out of his way except for formal or social contacts.

During the second year Lionel Pincus, one of the lead investors, partner of E.M.Warburg, and director of Media Medica, insisted on raising an additional $3 million for MMI, which he did with some help from me. I was not fully in favor of raising that much money that early, partly because I was concerned about Ray Cohen's propensities. But the money was raised.

During the summer of 1969 Ray Cohen conducted his initial market testing program, which he supported with national advertising and huge promotional mailings. However, he ran into some some basic problems: The products were priced too high and were too fancily packaged; there were unresolved issues as to whether doctors would prescribe or purchase the programs, and if they purchased them whether thay would sell them to patients or give them away. These are all issues that should have been resolved in small scale preliminary marketing tests. To Cohen, my suggestion that preliminary tests were necessary, was offensive, and was taken by him as an accusation that his judgment was inadequate. When the large scale tests in the summer of 1969 did not demonstrate an immediately viable and expandable business, Pincus panicked. In September of 1969 he demanded that Cohen be fired and replaced and that I put my own MMI stock into a voting trust that would allow Pincus to

Notes and Recollections Written by Francis

TeleSession Corp.

Ronald A. Richards had been the Sales Manager at Basic Systems, responsible among other things for the market introduction and sale of Basic Systems' two big products -- Effective Listening and Professional Selling Skills. He was one of the many Basic Systems employees who became very frustrated by Xerox's management style and who decided to leave. He joined me at BSA shortly after I left Xerox to work with me in the launching of new ventures. He was always exceptionally intelligent, hard-working, well-organized, and principled. I particicularly liked his willingness to go where his logic led him on any particular problem he tried to solve, even if the direction was highly unconventional. He was always trying to penetrate the core of every problem he faced, to get at its essence rather than just its surface appearance. He loved to reorder and rethink his priorities and to come up with prioritization decisions that shocked because they low-ranked priorities that seemed urgent to others. While all of these traits sound superb, the other side of that coin was Richards' weakness: He had an enormous capacity for self-deception. He deceived himself at the level of the underlying assumptions he would make in approaching a problem. He had a great ability to justify and defend premises that had not received the same level of objective elaboration as the logic by which they were developed and combined to yield their inevitable conclusions. He also had a great ability to select premises that would lead to conclusions he found emotionally satifying. This analysis of Richards is necessary to provide an understanding of the story of TeleSession Corp.

During 1967 and 1968, Richards, through BSA, provided some technical assistance to Gene Leonard at SRC and to Ray Cohen at Media Medica, to the extent

that such help was accepted by Leonard and Cohen. For example he developed a computerized model of the Media Medica business to assist the directors in understanding the implications of different pricing and marketing assumptions; He developed, together with me, business plans for possible new ventures. One was a proposed subsidiary of SRC called FISCO that was to provide computerized accounting, bookkeeping, and financial information systems services to companies; another business plan was for a Health Services Corporation that would have financed and part-owned group practices and associated clinics and pharmacies. This venture was finally turned down by the Directors of Media Medica. In 1968, Richards told me that he wanted to launch and head up his own company, and to own 10% of it. I agreed and gave him encouragement in this. He began with an old business concept of mine involving a computerized dating and people-matching service. This evolved into a new concept which he called "Momentum", consisting of educational self-improvement programs based on the use of "sponsors" who were advisors and educational consultants to the clients. This in turn evolved into a consumer service which offered group discussion sessions by telephone to people in any part of the country who had common interests about whcih they wanted to talk to colleagues with similar interests. By 1969 and 1970 Richards was experimenting with various business models and pricing and marketing schemes to make this service viable. He found that the Phone company's conference service was unsatisfactory and therefore decided that he had to develop a special piece of hardware that would allow him to bypass the phone company's service for conferencing. After much trial and error with potential suppliers, Fred Kantor finally designed such a piece of hardware for Richards and introduced Richards to some friends who built it for him. It was a unique system that equalized the voice levels on the various lines, eliminated line noises, and permitted visual monitoring of all voices.

During this entire period I provided Richards with guidance and with all of his funding, and consulted with him on all major and minor decisions. The relationship between us was excellent, and Richards' morale was always very high. The one difference we may have had is that Richards tended to lean strongly toward the consumer market and I felt that the most promising business model for early viability was industrial contract work involving the provision of telephone conference services to corporations. When I got Richards his first contract with Hoffman La Roche, he began to come around to my point of view on this, although he still did not quite abandon his other services. Reality and necessity did, however, push him over the edge and by 1972 he was confining his efforts to industrial contracts.

This he did brilliantly. He himself was a great salesman and he sold one contract after another, with minimal help from me except for consultation. The contracts he obtained, mostly from major pharmaceutical companies, became larger and larger, and his successes in delivering his "Word of Mouth Marketing Systems" service provided him with data and testimonials that he was able to use to good advantage in subsequent sales. But therein lay the trap into which he fell. The larger the contract, the more time and effort it took to sell and execute. Every year he was dependent on one or two major customers. He sold contracts in the $300,000 to $700,000 range when his total gross volume of business was about $1,000,000. In 1974 and 1975 he made a profit at that level because everything went reasonably smoothly. In 1976 one of these big contracts slipped somewhat and was delayed with the result that he had a slight loss. In 1977 a real disaster struck in that a $700,000 contract that was about to be signed was permanently lost because the plant that manufactured the insecticide in question exploded destroying the prospective customer's total manufacturing

capacity. Unfortunately for TeleSession, Richards had (against my strong urgings) built up his capacity in anticipation of getting that contract. He had doubled his staff and floor space, thereby expending all of his cash reserves. So now he demanded more capital, and proposed to raise it himself. But it turned out that he wasn't sufficiently experienced at that and failed. Because of his enormous pride and desire to control the situation, he didn't want me to do that for him. He may also have felt that the 1974 Wall Street Journal article would make me ineffective in raising money for TeleSession. I urged immediate and drastic cutbacks, but Richards wouldn't hear of it, and Abrams unfortunately supported Richards in this issue, arguing that Richards was in the best position to know what should be done because he was closest to the situation. As I feared, the odds caught up with us. One or two more big contracts slipped, and by the end of 1978, after Abrams and I had lent more money to the company as an emergency transfusion, Richards resigned and proposed the appointment of one of his subordinates, Loren Zesch as his replacement. Richards realized that ~~that~~ the company now had to be cut back drastically and its strategy changed. He must have felt unable or unwilling to do this. Abrams and I were highly pleased at Richards' resignation. During the preceding three years, Richards had been weaning himself from my influence and resisting most of my suggestions, to his great detriment I am afraid. I had been advising him to build more slowly and to broaden his customer base so as to spread the risk among more accounts. Nonetheless, there was no real acrimony and Richards and I stayed on good terms.

Once Loren Zesch took over, In January of 1979, I again involved myself very actively in TeleSession helping with management decisions, marketing, and

financing. By May of 1979 I had raised $300,000 for TeleSession from Dr. John L. Kemeny, a Brazilian acquaintance of mine Luiz Felippe Penna, and one of TeleSession's small shareholders Harry Binswanger. The capital was put in as notes with equity kicker. I also helped the Company get a few small contracts. The strategy, which succeeded very well, was to increase the number of customers and thereby reduce our dependency on any given one. That made us less vulnerable to mishaps and able to project revenues more reliably. We also added a new service at the end of ~~1978~~ 1979 called TeleFocus. This is a market research service featuring the assembly of hard-to-assemble groups of individuals for Telephone conferences on new or problematical products. The service was extremely successful and grew significantly throughout 1980, with excellent contribution to profitability.

In 1979 the Company still had a loss of $467,000 (not as bad as 1978 which was the disaster year) and in 1980 we were again profitable with a profit of $47,000 and rapid growth. To carry us through that difficult period of 1979 and 1980, Abrams, I, and some of the TeleSession executives led by Loren Zesch had to lend the Company additional sums in excess of $100,000. As a result, the Company is now carrying a debt load of about $750,000 owed to insiders (shareholders), and therefore has a negative net worth, making it impossible to raise or borrow additional money. My current problem, as of early 1981, is to get this debt converted into equity so that the Company will be able to raise the capital it needs for its continued growth and health.

The important and encouraging thing about TeleSession Corp. is that it is now very well managed by a highly intelligent, honest, and hardwarorking group of people who are totally dedicated to the Comapny's success.

UEC Inc.

UEC was an outgrowth of work I did with Xerox after their acquisition of Basic Systems. Shortly after their acquisition of Basic Systems, I made a proposal to Xerox to enter the early childhood development field as a business. I had come to the conclusion that the earliest years of a child's development are the most formative years and that investment in a child's educational development made early in the child's life yield a far greater return than educational investments made later. From this it follows that the child's parents are most important agents of a child's educational development, more important by far than teachers and schools. I believed that during the first one or two years of the child's life, his personality, learning style, and intelligence is formed, these being traits that deeermine what future teachers and schools are able to accomplish with him. Given this premise, it seemed to me just question of time before society, government, and parents became willing to expend both effort and money to make the most of the child's early years. Xerox management, however, paid no attention to my proposal, I believe it went unread as there was no one responsible for making decisions on long-range planning. However, Lee Brown, the fojnder of the erstwhile Science Research Associates (~~XRX~~ SRA), whose most recent company Learning Materials Inc. Basic Systems had recently acquired, In April of 1966 was very enthusiastic about my ideas. I announeed my intention to leave Xerox ~~in April of 1966~~ and Lee Brown signed a contract with me ~~for the~~ under which I would develop various products for Xerox in the areas of early childhood development, as well as ~~reading, writing, and~~ verbal and mathematical skills programs for kindergarten through 9th grade. I did this work through Behavioral Science Applications, Inc. But by January of 1968, Xerox

had decided not to enter any of these markets and to confine itself to the adult education market, stressing my old products Professional Selling Skills, and Effective Listening, and other products of that type under development. So, my contract with Xerox was terminated and I decided to proceed on my own with the early learnign and business. By that time I had successfully launched and financed Media Medica, and was confident that I could do the same with a new and more ambitious company that I woul call Universal Education Corporation, in which I would play a much more active role personally than I was able to play in Medica Medica which Ray Cohen was running.

One of the products I had developed under the Xerox contract was a very promising audio-visual teaching method whidh involved a heavy paper card with a magnetic stripe painted on it. The card could be inserted into a tape reader that read the magnetic message on the stripe and played it through a speaker. The child's task was to look at the letters, picture, or diagram on the card and anticipate the taped message before listening to it. This could be used to teach reading, numbers, or anything else up to a certain very elementary level.

My initial idea for UEC was to sell this type of system to parents for them to present to their children as a toy or game. I also had various other toys and games designed to promote meaningful interaction between parents and children and to assist parents in contributing to their childrens' eductional development. To assist me in developing this type of business I hired two of my former associates at Xerox-Basic Systems. One was Ronald A. Richards and the other was Otto Vanoni. We considered a door-to-door selling method, the direct mail method, and the "Discovery Center" as

we later named it. The initial idea was a combination of these methods with the Discovery Center serving as an adjunct service center for equipment maintenance, diagnosis of childrens' educational development, and retail outlet for additional products. ~~XXXXXX~~ Based on these ideas, I wrote a business plan in the summer of 1968 and easily obtained the initial funding for it. I raised $3.7 million from a group of trust companies and private investors, including some investment bankers. Among them were the U.S. Trust Company, Connecticut Bank and Trust, the Mellon Bank, Manufacturers Hanover Trust, and Stralem and Company.

I proceeded to staff the Company with people who were highly experienced and ~~xxx~~ proven experts in their respective fields. I didn't care how much I had to pay to get the very best people. That's where I made my first major mistake, however. I ended up with executives who had indeed reached the top in their respective fields, and who were extremely competent. The trouble was that these same people were also politicians and corporate empire builders. Instead of rolling up their sleeves and doing what needed to be done, many of them immediately started writing plans for their activities and justifying the need to build staffs underthemselves. They wanted to manage others who would do the required work rather than do it themselves. At the same time, they started fighting among each other -- politicking to increase their own dominion within the company at the expense of rival executives. A large amount of time and energy was expended in this type of activity, usually at the expense of the work that needed to be done. I had unwittingly selected people for their political infighting skills and flair rather than for their task orientation. I would have done better hiring younger and less experienced individuals who would have been ready to work hard at building the comapny rather than their own places within it.

A second mistake I made was to allow everyone too much freedom to develop his own ideas. For example, I hired a very competent and brilliant writer and editor, David C. Whitney, to develop the educational materials and programs. Unfortunately he had an enormous ego and an inflated view of his understanding of education. He needed to put his own name on everything he touched and had very strong pride of authorship. He was also extremely prolific and creative. The result was that he was unable to use my own ideas and developments. He refused to use me even as a consultant or source of ideas. The audio-visual card system describee above was the first casualty of Whitney's work, and everything slese I had done soon followed. My mistake was to agree to Whitney's replacement of my products with others of his own creation. Mine were profounder and had more ultimate promise, though they cretainly did not constitute a complete program yet. I had very little ego involvement in my products and even less time to advocate and defend them. I saw an opportunity to take advantage of Whitney's enormous motivation and creative drive by letting him develop his own ideas. So I let him proceed to scuttle my products and replace them with his own. Whitney's orientation was to develop the "Discovery Program" which would be adminsitered through the Discovery Centers, rather than to develop products that could be sold. He and some of the other executives I hired quickly turned UEC into a service business rather than a product business. Each executive had his own motives, which I was not perceptive-enough to see through at that time. Dr. Sidney Nelson, the former Executive Vice President of B'nai Brith, felt comfortable only with a highly professional image for himself and UEC, and uncomfortable with product-oriented organization that might have looked like a retail chain or an encyclopedia company. Gerald Levy, my Vice President of Operations who was in chage of setting up the Discovery Centers, had a

background of retail operations, and felt most comfortable with a business that centered on stores, physical premises, and customer traffic rather than, say, direct mail sales, door-to-door sales, or sales to schools. He wanted to open discovery centers. And David Whitney himself was a writer, not a product developer. The Discovery Program as a service was something he and his staff could write, which is what he was superb at and had done before. Since all my key Vice Presidents advocated the service model of the Discovery Centers, rather than a product development and marketing business, I agreed and went along. I agreed too readily. I felt that if I went against their unified recommendations they would be resentful and become demoralized, and would not take responsibility for the results of our efforts. I may also have been afraid that perhaps they were right and I was wrong. In retrosepct, however, I believe that I was right and they were wrong, and that I should have stood my ground.

But these are types of errors that one must expect to make in launching a new type of company in a new industry in which there are no models or precedents, and they are errors that UEC could easily have survived because the total business model, as it in fact evolved, was a viable one. I had hired a salesman with government selling experience, Richard Ney, to sell contracts to federal and state government agencies. He was successful in this and by June of 1970 UEC had signed a $4 million per year five-year contract with Pennsylvania. I also hired Lee Brown who no longer had a siatisfactory job at Xerox Learning Systems where the decision had been made to concentrate on the adult education market. Lee Brown became President of a UEC wholely owned subsidiary Learning Research Associates in which he was given a 10% personal ownership. Lee quickly hired some excellent people with whom he had worked before and obtained some very fine products. It was

not long before he had very good sales and had established an excellent reputation and image for LRA. His sales were exclusively to schools and school districts. By the time he died of a heart attack in March of 1971 at the age of 49, he had achieved sales of $400,000 per year with the expection of doubling again in the following year.

One of the first things I did after obtaining the initial October 1968 MMM financing for UEC was to design and mount a marketing test of the MMM business model to determine exactly how a Discovery Center should be structured, how the products and services should be priced, how the Centers should be advertised and promoted, and where they should be located. We set up nine Discovery Centers in different kinds of areas -- urban, suburban, blue collar, middle class, affluent, conservative, shopping centers, apartment complexes, rural areas and so forth. The main variables in the design were socio-economic status of the community, population density , and accessibility to a center. In order to expand the Discovery Center business it was important to know what types of communities could be considered for locating centers. I knew that some of these areas would be unsatisfactory, but I had to know what the minimal specifications for locations were.

David Whitney and his staff developed an excellent program for use in the centers -- a fairly comprehensive system of early childhood development which provided children with stimulating educational experienees at the Discovery Center. The program included films, special games, filmed puppet shows ~~that~~ designed to motivate the children to engage in certain activities, and continuing evaluation by the learning supervisors of each child's indivi-diaul progress and needs. The Discovery Program also included materials and recommended activities for parents so that parents would be able to foster their childrens' educational development at home til the next visit to the

Discovery Center.

As the test approached its conclusion, it seemed that the only location that could support a profitable Discovery Center was a housing development or apartment complex where there was a large urban population. We had one such center, the one located in Lefrak City. Just as that center was turning profitable, we suffered a major disaster there. In the Spring of 1971 the center was destroyed by a series of floods from rains and melting snows. As the center was below ground level, water poured in from the streets every time it accumulated, and filled the center to a height of 6 inches. Since this resulted from the landlord's negligence, the matter is now in litigation. UEC is sueing Samuel J. Lefrak, the landlord for a total of 8 million dollars which is the cost of the entire Discovery Center market test.

UEC's other major setback had to do with the Pennsylvania contract. In June of 1970, UEC signed a contract with the Commonwealth of Pennsylvania for the development of a model of educational daycare that could be adopted on a state-wide basis. The contract anticipated that UEC would first design the program and the system, and then establish and operate some day care centers based on that model. The contract was funded 25% with state funds and 75% with the U.S. Department of Health Eduation and Welfare's program of Aid for Families with Dependent Children (AFDC). We were able to obtain the contract because of their highly favorable publicity that the Discovery Centers had received and the impressive professioal credentials of many of the people who were associated with UEC either as members of the Advisory Board or as Directors. Among these were many very well-known people whose names carried great prestige in the academic and child-care establishments. It was anticipated that the Discovery Program would be adapted

Discovery•center

Introducing the Discovery Centers

The Discovery Centers are the culmination of four years of research by a group of nationally known experts in child development and educational psychology who had as their goal the creation of a new and much needed pre-school educational resource accessible to all children. Each Center is run by a team of highly qualified teachers and educators who have devoted their lives to children, and who combine credentials with skill and dedication.

WHAT IS THE PHILOSOPHY?

The Discovery Center is based on the thesis that happy, well-adjusted children--and successful adults--have one thing in common: They love to learn. They also possess self-confidence, initiative, perseverance, ability to work with others, and the ability to solve problems. The developers of the Discovery Program believe that children who have these traits will later feel challenged instead of frightened by our fast-changing, complex world. A love of learning is the outgrowth of some basic traits that must be learned during the early formative years when the child's mind and personality are still developing. A child will acquire these traits only through positive stimulation and motivation, not through pressure.

THE ROLE OF THE PARENT

Every child has an intense desire to learn, starting soon after birth. He learns by exploring his environment and discovering how the world functions. He does this from the time he awakes in the morning until he goes to sleep at night. Learning is as important to the child as eating and drinking. How much the child gets out of his daily quest for learning experiences depends in large part on the parent. The sensitive and skillful parent can greatly multiply the yield of this quest and give it added excitement and meaning. And the parent should do this without pressure, without "pushing" the child to learn. Learning must be a natural, joyful activity if the love for learning is to be retained and cultivated.

One of the Discovery Center's primary purposes is to help parents develop a richer relationship with their children, not by spending more time but by making better use of the time they spend already.

Over 10,000 reports from over one thousand parents whose children have participated in the Discovery Program provide good evidence that the Program has produced noticeable changes for the better in the parent-child relationship, and has had a profound impact on a high percentage of the children.

WHAT SERVICES DOES THE DISCOVERY CENTER OFFER?

Parents bring their children to the Discovery Center for a variety of educational services. Here are some of them:

1. The Discovery Program: Objectives

   This widely acclaimed program (see the enclosed article from American Baby) is designed to develop the child's love for learning, and to help him learn over 2,000 skills and concepts which every child must acquire.

   Activities and Materials

   The Discovery Program exposes the child to these skills and concepts through a wide range of stimulating experiences -- including games, puppet shows, films, and learning devices. There is a TV camera that the children can operate themselves and with which they can make their own TV movies. (Something fantastic happens when a child sees himself on TV: for the first time in his life, he sees and hears himself as others see and hear him.) Another device is the Chatterbox. The child puts in a card which may have pictures, words, or symbols on it; and the Chatterbox reads the contents of the card to the child. Or, the Chatterbox may ask the child a question.

   In each Discovery Session a wide variety of educational materials are used - biology and science materials; construction materials; and all the vital conventional equipment such as clay, paints, and doll houses.

The Discovery Sessions

The Discovery Program, which children attend for one, two, or three sessions a week, has a seven to one ratio of children to teachers. The sessions are individualized: Within the theme of the session, each child is encouraged to do different things according to his ability and interests. If a child is either unable or not disposed to participate in the session, he may go to another part of the Center and engage in one of the many possible alternative activities. Because the emphasis is on discovery, initiative, and the development of a love of learning, all children are encouraged to explore the rich learning wonderland of the Center.

Parent Conferences

While the children are busily engaged, Discovery Center staff members make continual observations of each child's learning activity. These observations in turn form the basis for periodic parent conferences that assist parents in developing a better understanding of their child's educational development and their own role in it.

Accordingly, the Discovery Program is designed to involve the parent and the home environment as an integral part of the total learning system. This is accomplished in a variety of ways: At the end of every session at the Discovery Center, the parent is given a new Parent Suggestion Notebook that suggests games and activities that will enhance the learning of certain important skills and concepts. The suggestions include things to talk about, things to do together, and ways of effectively handling common everyday situations. Also included in the Notebooks are general discussions about child rearing and ways of observing and recording a child's progress. The Discovery Center offers for optional purchase a variety of educational materials, books, and toys, selected for their relevance to the skills and concepts being learned, and suitable for the parent-child at-home learning activities. The Discovery Center also offers special parent-staff conferences to review each child's progress, and a series of seminars and discussion groups for parents on pertinent child development topics.

2. The Reading Improvement Program

Every child in school can benefit by improving his reading. Academic success is more highly correlated with reading ability than with any other single skill. The Discovery Center offers a reading improvement program that has been nationally tested on thousands of children with excellent results. The basis of the program is an initial evaluation of the child's reading skills and identification of the areas in which the child could improve. Based on the results of this evaluation, the child is given the reading materials and instruction for each separate reading skill component where improvement is warranted, and which experience has proved to be of greatest benefit to that type of reader.

Most of the children in the Discovery Center's reading program are referred to the Discovery Center by local schools and reading specialists.

3. The Supplementary Enrichment Program

Many children - gifted and average alike - feel insufficiently challenged by their school or kindergarten. They may be bored or simply not learning at their full potential as a result of the regimentation inherent in large classes, lack of individualized attention, or inadequate educational facilities.

For such children, the Discovery Center offers a Supplementary Enrichment Program to introduce them to some of the best and most stimulating learning materials used today in the most innovative schools. Among these learning materials are:

Science: A Process Approach	Kindergarten through 6th grade
The Michigan Language Program	Kindergarten through 3rd grade
Some of the best educational films	

Moreover, the learning materials are enhanced by the setting in which children learn, a Discovery setting. Their creativity and initiative are stimulated; they are treated as individuals and can learn and explore at their own pace rather than in a lockstep with others; and they have the attention of teachers who specialize in helping every child achieve his maximum potential.

The Discovery Center's Supplementary Enrichment Program is more than a supplement for school: It helps the child succeed in life by preparing him for the challenges he will meet. It does this by maintaining his curiosity, his learning initiative, his creativity, and most important of all, his love of learning.

4. Educational Products

The Discovery Center offers a unique consulting service for parents who are interested in purchasing educational materials to enhance the educational status of the home. The staff will help parents select the most appropriate products, suggest a variety of ways in which they may be used, and answer questions about the materials at any time.

For example, the Discovery Center Home Learning Kit consists of the Parent Suggestion Notebooks and the associated educational materials for extending the Discovery Program into the home. The Home Learning Kit is not designed to supplant Discovery Center attendance -- only to provide suggestions and program content for parents and children who cannot come to the Discovery Center. The Literature Sampler - a library of literature "teasers" -- short excerpts from good, well-liked children's books, permits children to preview their reading fare before committing themselves to a particular book. This system, used in thousands of schools throughout the country, can assist parents in enhancing the literary and cultural value of the home environment.

The policy of the Discovery Center is to add continuously to the line of educational products which it makes available. The criteria for selection of these products are educational effectiveness and usability in the home.

5. The Discovery Center Gift Certificate

Many teachers, parents, grandparents, and education-conscious individuals try to introduce children they particularly care about to the Discovery Center. The Gift Certificate has been created for this purpose. It may be redeemed at the Discovery Center for any combination of the Discovery Center's products and services, including the Discovery Program itself. It is perhaps the only gift for which it may truly be said that it will "last a lifetime".

DISCOVERY CENTER LOCATIONS

For more information about the services and products of the Discovery Centers now in operation, contact the Director of the Center most convenient for you.

The Discovery Center:	Miracle Mall, 265-75 Route 18, East Brunswick, New Jersey 08816	(201) 257-7010
	Ceylon Building, Lefrak City, 98-15 Horace Harding Expressway, Queens, New York 11368	(212) 271-8888
	Cedarbrook Mall, Cheltenham & Easton Roads, Wyncote, Pennsylvania 19095	(215) 887-8680
	Silver Lane Plaza, 808 Silver Lane, East Hartford, Connecticut 06118	(203) 528-9527
	1860 Willowbrook Mall, Wayne, New Jersey 07470	(201) 785-1770
	171 East Post Road, White Plains, New York 10601	(914) 428-4210
	Roosevelt Field Shopping Center, Garden City, New York 11532	(516) 294-0720

BEHIND THE DISCOVERY PROGRAM

The innovative thrust and professional strength of the Discovery Centers and their services are a direct consequence of the stature and quality of the individuals who are responsible for them. A partial listing of these individuals is presented below.

Board of Directors

FRANCIS MECHNER, PH.D., President of UEC, Inc.; former Education Consultant to UNESCO; Member of Advisory Board of Sesame Street (Children's Television Workshop, Carnegie Corporation); former Lecturer and Research Associate, Columbia University.

WILBUR J. COHEN, former U.S. Secretary of Health, Education and Welfare; now Dean and Professor of Education, Graduate School of Education, University of Michigan.

EDWARD GUDEMAN, Former United States Assistant Secretary of Commerce, and Director of MARCOR.

AMOS N. JOHNSON, M.D., Past President of the American Academy of General Practice; Member of Governor's Committee to Study the Public School System (North Carolina).

GENE T. TAGLIAFERRI, Assistant Vice President, United States Trust Company.

PALMER WEBER, PH.D., Chief: Corporate Finance; Troster, Singer and Company; Former faculty at University of Virginia; PH.D. from London School of Economics.

National Advisory Board

WILBUR J. COHEN, (See Above).

NORMAN COUSINS, Editor, Saturday Review; President of the World Association of World Federalists and Director of National Educational Television.

MARTIN DEUTSCH, PH.D., Director of the Institute for Developmental Studies and Professor of Early Childhood Education, New York University.

ROBERT GLASER, PH.D., Director of the Learning Research and Development Center, University of Pittsburgh.

THEODORE W. KHEEL, Labor Arbitrator and Director of the Academy for Educational Development, Inc.

MYRTLE McGRAW, PH.D., Chairman, Department of Developmental Psychology, Briarcliff College.

BAYARD RUSTIN, Executive Director, A. Philip Randolph Institute; a founder of the Southern Christian Leadership Conference.

Consultants

URIE BRONFENBRENNER, PH.D., Professor of Psychology, Human Development and Family Studies, Cornell University; Member of Planning Committee for Project Head Start.

LAWRENCE S. KESNER, PH.D., Director and Founder, Plainfield (N.J.) Consultation Center; Past President, Association of New Jersey School Psychologists; Past President, New Jersey State Clinical Psychology Association.

THOM VERHAVE, PH.D., Professor of Psychology, Queens College, New York; previously Consultant to the Stanford Research Institute and the American Psychological Association's Program of Advisory Services for Education and Training.

JACK I. BARDON, PH.D., former Chairman, Department of Educational Psychology, Graduate School of Education, Rutgers University.

EDWARD B. FRY, PH.D., Director of the Reading Center and Professor of Education, Rutgers University.

Professional Staff

Among the many staff members who have contributed to the development of the Discovery Center and its services are:

ARISTOTLE ANTHONY, PH.D., Educational Psychologist.

JESSE BACHER, PH.D., Educational Psychologist.

LEE D. BROWN, President of Learning Research Associates, Inc.; formerly Executive Vice President of Science Research Associates, Inc., a Consultant to the Center for Urban Education in New York and an Advisor to the Commission on Instructional Materials, ASCD.

LEOTA JANKE, PH.D., Educational Psychologist; formerly Assistant Research Professor, Tufts University.

FRANCINE KLAGSBRUN, Creative Director; author of books for young people; formerly Executive Editor of Cowles Education Corporation.

FRANCIS MECHNER, PH.D., President of UEC, Inc.; former Education Consultant to UNESCO; Member of Advisory Board of Sesame Street (Children's Television Workshop, Carnegie Corporation); former Lecturer and Research Associate, Columbia University.

KAREN MILLER, Director of Instructional Materials; formerly Systems Editor at McGraw Hill Book Company; and Educational Consultant and Product Development Manager for Appleton Century Crofts.

DOLORES B. MOORE, Managing Editor, Learning Research Associates, Inc.; formerly Managing Editor of Encyclopedia Britannica Press and Editor of the SRA Reading Laboratories.

SYDNEY NELSON, PH.D., Vice President; formerly Associate Executive Vice President of B'nai B'rith and Administrator of its educational programs and community organization activities.

ROY STERN, PH.D., Director of School Services, Learning Research Associates, Inc.; formerly Education Consultant with Booz, Allen and Hamilton and Superintendent of Schools.

DAVID C. WHITNEY, Vice President; formerly President of Cowles Education Corporation; and Editor-in-Chief of Encyclopedia Americana.

DISCOVERY:

A NEW APPROACH TO EARLY LEARNING

BY GEORGE ENGLISH

"THE most important period of life," Maria Montessori once said, "is the first one, the period from birth to the age of six. For that is the time when man's intelligence itself . . . is being formed."

These are the years when a child's development is most rapid and when he acquires the basic abilities on which his later skills will depend. John Holt, in his book, "How Children Learn," says, "It is before they get to school that children are likely to do their best learning." This is the time when it is important to reach the child with guidance and experiences that will fulfill the needs of his growing mind.

Until now, parents have had little help and few formal programs to assist them in making use of their children's early learning abilities. Universal Education Corporation, founded in 1966, is a company which is trying to fill this vacuum with a new multi-million dollar project called *Discovery*.

Discovery is a structured early learning program for the 2½ to 6 year old and his parents. The program operates through Discovery Centers — elaborately equipped facilities where children come to play and learn. The Discovery Center is not a playground, a day care center or a nursery school. It is a general educational service which provides maximum mental stimulation and the widest possible range of learning experiences for the pre-schooler.

According to Dr. Francis Mechner, president of Universal Education Corporation, "The parent has a key role to provide the environment in which the child grows up. The *Discovery* program orients the parent and makes him more effective in that role by providing guidance, information about the child and materials, and instruction for the parent as well as the child." *Discovery* is really teaching both child and parent about early learning abilities.

Each Discovery Center is staffed with five to eight professionals, including a Center director (a former elementary school teacher); learning directors (two teachers with five years' experience and a degree in early education); and several learning aides (individuals with special training and experience in observing and working with children). Attendance parallels the school year, with groups beginning in September and January. The cost of enrollment is $20.00 a month if the child attends once a week and $38.00 a month if he attends twice a week. Universal Education hopes eventually to provide scholarships for families who cannot meet the financial demand. There are nine centers in operation currently, and they are rapidly being opened in communities throughout the country.

To the child, the Discovery Center is a futuristic romper room. For two hours each week, he visits the Center and plays with toys that range in complexity from simple letter blocks to computers that tell stories and play games. The playroom interiors are designed in a profusion of colors and shapes. Fiberglass forms section off special learning corners for individual activity. Books, coloring materials, record players, tape-cassette machines, video-tape recorders and educational toys are everywhere. There is even a television set which can be turned on with a simple switch so the child can make his own television program.

Free play periods separate the structured play activities and take up about half of each session. The structured activity at one session may include games that make use of word opposites, matching the shapes of letters and matching different kinds of wooden objects.

As the child participates in both structured and free play, there is continual observation of his skills, his readiness for new skills and his special learning needs. A two-member team keeps detailed records of each child, noting progress in 43 basic mental, physical and social skills. A few of these are: listening, drawing, measuring, understanding numbers, expanding vocabulary, solving problems and getting along with others. Not all of the categories are checked each week; at most, only 4 or 5. This is done in play situations that run from 10 to 25 minutes in

DISCOVERY: A NEW APPROACH TO EARLY LEARNING

length, into which the child is drawn or enticed, but never forced. As Dr. Mechner says, "Discovery is a child's way of learning." Therefore, the emphasis is put on the child's desire to explore. His curiosity is stimulated in the hope that it will broaden into a sustained interest. But if a child becomes bored or wanders off, that is his judgment of the activity's relevance to him.

For parents, the function of the Centers is more serious. They are information clinics, providing special data about their child. The results of all observations are reported to the parents each week, with primary emphasis on the child's cognitive (intellectual) development and needs. Other basic skills in motor coordination, character development, and social interaction are also reported. The child is sent home with educational toys and materials and suggestions to parents on how the material can be used to best advantage. The parents in turn fill out questionnaires on how the child responded and how the toys succeeded or failed. Parents must reinforce the program at home so their child can get the most from it.

How do parents feel about the program? At the Center in Hempstead, New York, there is general enthusiasm among the mothers. In just a month, they discovered that their children's attention spans were longer, that they were playing more independently, and exhibited a self confidence they had not shown before. In addition, the mothers found that they were learning new ways to play with their children.

The *Discovery* program is unique in several ways. By using devices representative of our modern technology, such as the television and computer, as toys, it recognizes the important link between play and learning, and introduces the child to complex machinery. As one of the staff members of the Hempstead Center said, "The computer is a fact of life. You can't make a telephone call without using one. Children, who are going to be the adult generation in the year 2000, should learn to be comfortable with computers now."

Discovery is also unique in bringing to the child and his parents the knowledge and efforts of many educators, psychologists and early learning specialists. The results of early learning experiments have been confined primarily to the laboratory, but through the *Discovery* program, they are now available to many people on a large-scale basis.

By involving the parents in the child's development, *Discovery* places them at the helm of the child's learning, and their participation becomes crucial to the success of the program.

"The Discovery Center is only the tip of the iceberg," says Dr. William Wakefield, psychologist at the Center in Hempstead. "It is an observatory to guide the child into new learning situations. It is not a school. But in it the child is being exposed to a wide range of things he might not otherwise come upon. It gives the parents a better means of educating their preschool child. They do it anyway. They educate their children from birth. The question is how they educate them."

Discovery is trying to help parents with that responsibility. While their theories of learning are based on many divergent views, their primary goal is to encourage children to love learning. If this can be accomplished before the child begins formal schooling, *Discovery* will have accomplished its goal. If widely successful, it could help place as high a premium on preschooling as on the college education. □

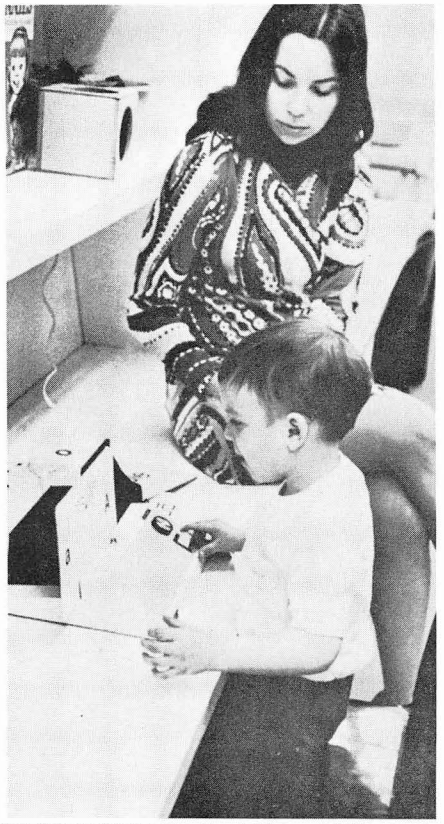
For information on Discovery Centers in your area, write to:
Dr. Sidney Nelson
Universal Education Corporation
1501 Broadway, New York, New York 10036

Reprinted from American Baby Magazine, November 1970.

Youngsters at the Discovery Centers make up stories and play guessing games with a specially programmed computer. This activity helps develop reading readiness.

This symbols-and-words learning game was developed for the Discovery Center. It helps children make the connection between a sound and its visual counterpart — or symbol. If the child presses the right button, a light flashes on. The game helps build vocabulary and pre-reading skills.

At the Discovery Centers, children don't just sit in front of the TV tube. They "get behind it" and create their own TV programs with the aid of a video-tape camera mounted at their eye level. Besides learning to handle some of today's technological devices, the child is also having great fun.



The "chatterbox" helps the child connect the shape of a letter with its corresponding sound. A card "answers" with a taped voice explaining, "A is apple."

Fellows photo ac 66ff

baron in business world," says Edward Ziegler, director of HEW's Office of Child Development, "but there isn't enough in the public sector to provide the service."

Singer officials visited 40 schools before deciding on their own format. Kiddie Care got advice from five child-development specialists. Educare used the results of a survey of 150,000 preschool children, and Romper Room employed a PhD who had experience in the government's Headstart program.

The centers range from the simple to the sophisticated. Those that MultiMedia is erecting have "hills" molded into some of the floors for the children to roll down. Kinder-Care spends $5,000 to $10,000 on equipment for each of its centers. U. S. R&D has an "atom playhouse," peopled by brightly colored protons and neutrons "and when they collide funny things happen, like teaching physics to five-year olds." Other centers feature video equipment, a talking box that says "I'm the letter A" when a child inserts a card marked A, and magic walks where stepping onto square "1" lights up square "2."

The centers charge from $20 to $45 per child per week for full day-care, depending on geographic area. There are also various special rates for half days, portions of a week, and more than one child from the same family. Learning Tree charges $23.50 a week based on costs of $1,100 per child per year. The company says it can afford to pay teachers more than public schools and finds that over-all staff costs are less than 50% of total expenses.

Franchise fears. Experts like Mrs. Lansburgh say they can be "all for business," but they also point out that "children are children. You can't merchandise them like hamburgers." The aspect that educators attack most is franchising, and an article entitled "Kentucky Fried Children" has already appeared in one national magazine. Actually, Performance Systems Inc. ("the same people who brought you Minnie Pearl," says a jaundiced educator) has one center operating in Nashville, but past grandiose predictions of a string of 1,000 have flown. Standards will still fluctuate, if only because state regulations vary wildly. A new-style franchiser insists: "Every minute in our centers is programmed. If they [the employees] can read, they can be just like degreed teachers."

Others insist that with proper controls franchising is fine. MultiMedia President Brown maintains: "I'm a professional educator, I've done time with the public schools and government, and I don't change if I step across to business." A stipulation that requires their franchisees to pay teachers higher than public school rates will be one control in a franchise package complete with teacher training. Hasbro Industries' Romper Rooms will require program directors with MAs.

Even so, Singer and Universal Education refuse to franchise because, they say, it would lower the centers' quality. James Leidish of Learning Tree says: "There are only two reasons people franchise: money and to motivate their managers." As a result, he offers equity to his certified teachers.

The educational value of the centers is also being questioned. Few of them really teach, and anyone who claims an "educational yield" is inviting charges of fraud, says Burton White, a Harvard preschool specialist.

Providing the service can be profitable. MultiMedia tells franchisees, who pay $40,000 for a package that even includes recruiting the first class of 90 children, that after investing in a building and paying salaries of perhaps $130,000 they can expect to make $40,000 profit a year. Singer reckons it makes a profit on anything above 80% capacity at its 270-child enrollment. Romper Room figures a 31% profit with 90% enrollment and projected yearly expenses of $94,000.

The future may hold a billion-dollar bonanza for the fledgling industry. If President Nixon's day-care proposals, part of his Family Assistance Plan, are passed by Congress, as they seem likely to be, they would provide $386-million in the first year. Experts translate this into 150,000 places for preschool children.

Longer term, a bill sponsored by Representative John Brademas (D-Ind.) and Representative John Dellenback (R-Ore.) would provide $700-million for day-care in 1973, $800-million in 1974, and $900-million in 1975. The scheme would embrace middle-class children who would pay fees on a sliding scale, as well as poor children served by FAP. This bill, too, stands a good chance of being passed.

These plans are for purely preschools, but a wider field seems likely to open up, at least by Singer's reckoning. The company has become the first actually to compete with public schools by enrolling children through the third grade at two New Jersey centers. "Seventy percent of school bond issues have been voted down," says Educare's Ney. "I take that as a vote of no confidence in the public schools. Parents are willing to give business a chance." ■

The Universal Education approach

The Discovery Center is perhaps the ultimate in education for the preschool set. It is the brainchild of Francis Mechner who, armed with a PhD and foresight, concocted Basic Systems, the learning division Xerox acquired in 1965 for roughly $10-million.

Now president of Universal Education Corp., Mechner has spent some $5-million in the last five years exploring the area of early childhood education. The Discovery Center that is the result is unlike any nursery of the past. Its stimulating modern buildings are aglow with color and crammed with hardware—TV videotape components, microscopes, and talking machines.

The center totally dispenses with the idea of being a tot-parking lot for busy mothers. Children attend for only two or four hours a week (at a cost of $20 or $38 a month). Mechner explains: "The root of all learning comes from parents. Therefore our approach involves the parent. We aren't teaching children—we are teaching parents how to be more effective teachers." Hence, in play sessions, teachers merely introduce concepts such as "tall" and "short," or differentiations such as "only," "some," and "all." Parents are given observations about their child, a list of things they can do to build his concepts and skills.

The package is designed to be easy enough that a child will succeed, grow confident, and take pleasure learning.

Mechner says such a program should be a success not only educationally, but from the standpoint of merchandising. Since children come for only two-hour or four-hour sessions, the staff is not in a 5-to-1 or 8-to-1 ratio with one group of students, but sees different groups daily, five days a week. Volume makes the extraordinarily heavy investment in staff and plant (typically $100,000 to start) modest per student without watering the educational soup. The sale of take-home materials also helps fill the till, so that Mechner feels the center could eventually return a 20% profit.

Nine centers are now operating, all in the Northeast, testing various combinations of curriculum, class size, and teaching methods. Mechner estimates that there will be 30 within a year, and perhaps 100. When he is sure of the "exact formula," the number will be limited only by Universal Education's ability to put up new ones.

Business Week
EDUCATION

REPRINTED FROM ISSUE OF: OCTOBER 31, 1970

Business takes care of the kiddies

Dozens of companies see profits in preschool centers

Child's play has become a serious business. Day-care enrollment has skipped from a mere 182,000 in 1963 to 640,000 now, and as one persnickity mother puts it, "a place of merit has a waiting list two years long."

A small-scale approach to toddler care no longer works—educationally or financially. "The nice lady at the neighborhood nursery who kept a collection of kids amused with a carton of crayons doesn't make sense," says Richard Ney, president of Educare, a new division of Universal Education Corp. that just snared a State of Pennsylvania contract to provide educational day care for 2,000 youngsters.

Business has only just put a foot in the nursery door, but it has done so in every conceivable way. Some of the methods:

- Chains of preschool centers, run by such companies as Singer Co., Kiddie Care, and Learning Tree, which are aimed at the education-oriented middle class.
- Franchise operations, which some companies, such as Romper Room, MultiMedia Systems, and Kinder-Care, have set up along with their own.
- Systems developed uniquely for government-financed child care, such as those that U. S. R&D will soon be running.

Singer, which has been exploring the possibilities for more than a year to the tune of $1-million, has made what it calls a "slow start" with two schools already open and another eight planned for next year. Year-old Kinder-Care now has 13 centers operating and expects to have 18 by December.

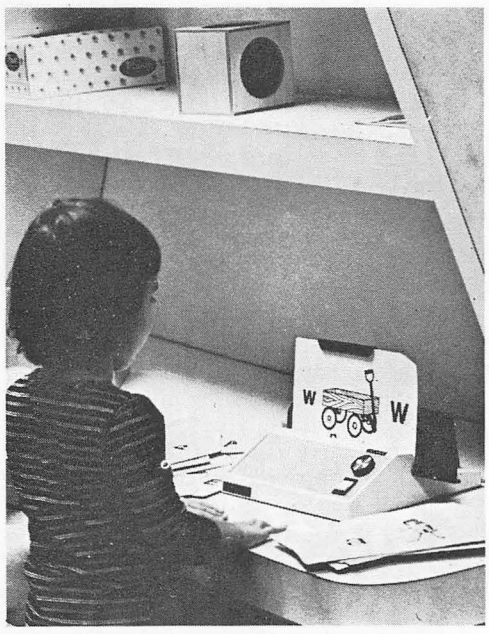
At least 25 and perhaps as many as 50 companies are now actively in the field, which has swelled so fast not even the Health, Education & Welfare Dept. knows who all the entrants are—or who will offer education rather than simply offering "parking lots" for children. Even so, the real thrust is likely to be education-oriented. Management consultants probing this field at Case & Co. agreed with researchers at Arthur D. Little: "You don't want to be a babysitter!"

Research base. Business did not discover junior's learning capacity—educators did. "Just about 80% of all research in early childhood development, as the pedagogues put it, has been done in the last 10 years," says Dr. Sandra Brown, president of MultiMedia Systems. Research uncovered that from day of birth the child is a diligent student, despite the lack of diligent teachers. Moreover, "learning is incidental to a gratifying experience," says Urie Bronfenbrenner, a Cornell professor and consultant to Universal Education. Estimates vary, but Edmund Gordon of Columbia Teachers College states: "In general, the level of intellectual functioning is reasonably well-established by three or four years, if the youngster is not exposed to a radical change." And various tests conclude that children surrounded by "stimuli," "varied environments," or "super-mothers," meaning challenging, innovative mothers, score 10 to 15 points above average on IQ tests.

Most preschools use the pitch of Francis Lemansky, director of Early Childhood Learning Centers: "The ages three to six are the big years." Therese Lansburgh, president of the Day Care & Child Development Council of America, states: "The public school is not the great equalizer. Those who start behind, stay behind. The time to pursue the American Dream is before school."

When early learning lore reached policy planners in the Johnson Administration, Headstart was born, and interest in preschool swelled. TV's *Sesame Street* "was built on the rolling wave," says Sam Granato, of the child care office at HEW. "Astute businessmen saw statistics on working mothers and realized the fantastic need. Being astute businessmen, they all arrived at the same astute conclusion at the same time." The statistics are impressive: 12-million working mothers with preschoolers, and the number of working mothers (with children to age 18) expected to rise to 70% by the end of the 1970s from only 42% in 1960.

Planning. Some of these companies are aware of "the commercial taint," as Singer Group Vice-President Lloyd Kelly puts it, and for that reason have done honor roll homework. "Many in the education world see the robber



A teaching machine that talks helps a little girl.


Closed-circuit TV is a learning aid at this Long Island (N. Y.) center.

for use in day care centers throughout the state. It was a 5-year contract at 4 million dollars for the first year and 6 million dollars for each of the subsequent 4 years. Unfortunately, Governor Schaefer, under whom the contract was signed, left office a few months after the contract was signed. The contract was signed in May and he left office in November, and was succeeded by Governor Shapp, who brought in with him a whole new team. Some members of this new team, the new Secretary of Welfare, Helene Wohlgemuth and her young legal advisor, Sandy Leopold, decided to get rid of this contract, just to make some political points. They felt that they could derive some political benefits by eliminating New Yorkers from their state as providers of child care services. There was obviously some opposition to this contract within the state on the part of the Pennsylvania early childhood education establishment, which is strong in most states. There was some resentment that an out-of-state contractor had been brought in, especially a commercial firm from New York. So, Leopold simply blocked our ability to obtain leases for the day care centers by failing to approve or act on any of the leases we submitted to them. Under our contract, the State was actually to provide us with the required physical facilities, but when they didn't, we went out and started looking for some on our own. And then, in April, they sent us a telegram saying that the contract would not be renewed for the escond year. I hired Ted Sorensen, who was a well-known attorney, formally a Kennedy advisor. He and I went together to see Governor Shapp, whereupon Shapp decided to reverse the decision that had been made by his subordinates. However, the battle continued. Shapp's subordinates continued to fight us, and Shapp finally said that he will request an audit from the U.S.Department of Health, Education,and Welfare, who, after all

was supplying 75% of the funds. The audit was initiated in July and was finished about 2 years later. HEW made the determination that UEC is owed 1, 431.000 dollars by the state and praised UEC's performance. Naturally, we were owed much more, but 2 years had gone by, we had spent most of our capital just waiting. During that time it was also difficult for us to get contracts with other states, although we did manage to get some small contracts, one with Alabama, one with Georgia, one with Nebraska. I will come back to those in a minute. But the adverse public relation resulting from the well-publicized Pennsylvania dispute hampered our efforts to obtain new contracts. So, when the HEW audit report was issued instead of paying us in accordance with the recommendations of HEW, the State said that more than 6 months had gone by since our claim matured, and therefore, under the statute of limitations that govern the payments of claims, we were no longer entitled to receive anything. During that period we obtained several contracts, one with Alabama for about $600,000, one with Governor Carter of Georgia, where we developed a state plan for every child in development for the state. Carter was so pleased with the work that we did, that he publicly commended us in front of the entire cabinet. That was at the end of 1971. We continued to work with Georgia and we had contracts worth a total of about 300,000 or 400,000 dollars. We started our system in Atlanta and we used it in a school district that had about 500 children in it. Later we had a contract with the state of Nebraska, under which we developed a Nebraska early childhood development program. That was at the first half of 1973. But it became more and more difficult to obtain contracts of this type, for various reasons. One that was the climate of Washington for funding this sort of activity

became gradually worse. Also the adverse public relations from the Pennsylvania contract continued to hamper us, and our financial conditions continued to deteriorate. The company during that time was mainly subsisting on money that I lent it. I lent the company approximately 4 - 500,000 dollars during that period of time, my own money. In March of 1971, we had another big setback. UEC had a subsidiary called Learning Research Associates, whose president was Lee Brown. He was a very well-known publisher and education industry executive. He was the person, who founded and built Science Research Associates, a company that I.B.M. bought for about 8 million dollars a few years before. Lee Brown was the President of Learning Research Associates and begun to build it very successfully. The company had beendoubling every year and around March of 1971 it had reached the volume of about $400,000 per year and growing at a rate that would probably have resulted in a doubling of that volume within a year. However, in March of 1971, Lee Brown died of a heart attack, about two weeks before Pennsylvania sent us the telegram stating that they will not continue with our contract, After Lee Brown's death, LRA was unable to stay on course. His enormous prestige in the industry was necessary to inspire the confidence of school systems and schools to try LRA's new products and to give LRA big contracts. It was also necessary for attracting high-quality authors and products. First I allowed one of his key subordinates, a former school superintendent who had been Lee Brown's Director of Marketing to assume the presidency of LRA. When that didn't work out, I hired a man from outside, George Stern, as President. But Stern couldn't do it either. He had an unending series of complaints and excuses - inadequate ownership for himself in LRA, insufficient capital with which to develop and print products, in-

terference and harrassment by Oscar Weitzberg, etc., all of which were probably justified. In any case, LRA gradually went downhill and by 1973 it was dormant. We licensed LRA's products to various publishers who ended up not doing much with them.

During the same months in which I had the problems with Brown's death and the Pennsylvania contract termination, I also had another problem that took up an inordinate amount of time and energy. One of my key executives in UEC, Richard Ney, the salesman who had obtained the Pennsylvania contract, was conspiring to persuade some of the other key people in UEC to join him in forming a new company that they would jointly own. That company would take over the contract with Pennsylvania and three or four other contracts that Ney thought he had sowed up. He told them that he had the support of powerful people in Washington, financing, etc. Fortunately I had a spy who kept me fully informed of Ney's subterfuge and scheming and I was therefore able to keep Ney under surveillance. The complication was that Ney claimed to have in his camp some key people in Washington who were extremely important to UEC. It took me several months to make sure that Ney in fact did not have these people in his pocket and in June I was able to fire Ney without risk, which I did.

Also during the period April 1971 through September 1971, UEC's most important Discovery Center, the one in Lefrak City, suffered water damage from a series of floods that effectively destroyed it. The Center was located in a renovated basement of an apartment building, several feet below ground level. Because of some construction and drainage problems, every rain or snow resulted in six inches of water in the center. There was no choice but to close the center down, effectively invalidating and destroying the entire

Discovery Center market test. The Lefrak Center was the one that could have served as a model for expanding the Discovery Center business and for the establishment of similar centers in comparable other locations.

So, during a period of several months, all of UEC's businesses were destroyed.

Upon receiving the termination notice from Pennsylvania I initiated feverish efforts to reverse their decision and to have the contract reinstated. I hired Ted Sorenson, J.F.Kennedy's former assistant, to help me in this. We quickly succeeded in persuading Governor Shapp to reinstate the contract, but Shapp had to buck his own subordinates who had strong political motivs for wanting the project terminated. Also, the contract had come under attack in the Pennsylvania press, at the instigation of the State Comptroller Robert Casey whose constituency in Scranton wanted the contract terminated. So, Shapp compromised by asking Secretary Eliot Richardson, Secretary of HEW, to conduct an audit of the UEC contract and to provide guidance to Pennsylvania regarding the possible extended and renewed contract, and regarding the amount of money Pennsylvania owed UEC. Richardson promptly sent nine federal auditors to UEC who spent seventeen months, on and off, conducing an incredibly detailed audit and evaluation of UEC's performance under the contract. During this entire period, we made continuing efforts to settle with Pennsylvania, but always to no avail.

In November of 1972, HEW issued the final report, which established that Pennsylvania owed UEC about $1,400,000 and that UEC had developed an excellent early childhood development system ready for use in day care programs. They also found that UEC had fulfilled all of its contractual obligations and that any tasks UEC had not

(notes by Francis)

When it becasue evident that there could be a major hiatus in revenues from Pennsylvania, I immediately intensified UEC's efforts to obtain similar contracts with other states. I engaged Washington attorneys who had high level contacts with Governors and congressmen from various states. By the end of 1971 I had contracts with the states of Georgia and Alabama for projects in which UEC had the assignment of developing state-wide programs and plans for early childhood development, and for the implementation of these plans through the use of UEC's educationally oriented day care system. We performed very well on all of these contracts and the state agency officials with whom we worked always expressed great admiration for our intelligence and professional skills. Governor Carter even invited me and one of my vice presidents to his mansion for the purpose of commending us in front of his cabinet for the work we had done. But in all of the states in which we tried to obtain contracts or actually obtained them, we were continuously plagued by a continuing stream of adverse publicity emating from Pennsylvania instigated by Auditor General Casey through the public media as part of his ongoing quarrel with Governor Shapp of Pennsylvania. The libelous newspaper stories lambasting UEC's performance in Pennsylvania were well known and received wide circulation throughout the educational day care field, and it took great courage on the part of any state official to enter into a contract with UEC in the face of this type of publicity. The result was reticense on the part of the state officials we dealt with to go very far with UEC or to give us contracts so large that they might attract media attention. So, the ~~x~~ contracts I was able to obtain remained small small, below the threshold of press visibility. We had excellent contract prospects in more than a dozen states, due to enormous expenditure of energy and effort on my part, but most of these states finally decided to avoid the political risks they would have

incurred if they had proceeded with UEC. The Alabama contract involved my going to Alabama at least a dozen times in 1972 at which point we had grossed about $600,000 with Alabama and about $300,000 with Georgia. In Georgia our educational day care program was implemented in the Atlanta Schools, but was terminated in mid 1972 because government funding was discontinued by the Federal government agency that had been providing it. UEC had a proposal pending with Alabama for many millions of dollars to implement the UEC program on a state-wide basis, but approval did not seem to be forthcoming. In December of 1972, I obtained another similar type of contract with the State of Nebraska for about $150,000, but again, fear of adverse press publicity prevented them from going any further. In mid-1973 my last key employee, Dr. Ronald K. Parker left to form his own company, and I was then unable to continue to seek and perform contracts all by myself. That left Oscar Weitzberg, my secretary, and my bookkeeper to support the contract work that I was able to carry on by myself through BSA and the litigation efforts of UEC to recover its money from Pennsylvania. Operationally, UEC became dormant except for litigation against Pennsylvania and against the landlord, Samuel Lefrak, the real estate operator who owned the building in which the Discovery Center that had been destroyed by flooking in 1971, had been located.

Throughout 1971 and till September of 1972, the HEW Audit Agency continued their detailed audit and evaluation of the work UEC had performed under the contract with Pennsylvania. They studied every piece of paper and every payment connected with the contract. In November of 1972 they finally issued their final report which stated that Pennsylvania OWED UEC $1,432,000 and that UEC had developed an excellent early childhood development system ready for use in day care programs. They also found that UEC had fulfilled all of its contractual obligations and that any contract tasks UEC had not

performed, it had not performed because the State had prevented or obstructed their performance.

When we received our copy of this HEW report, we assumed that the long nightmare would soon be over and that we would shortly have the $1,432,000 which HEW said was due us. The Governor's assistant saw no problem (at first) and said that he would arrange for payment as soon as Casey and some others had had a chance to review the HEW audit report. In January of 1973 we finally received a copy of a scathing letter from Casey stating that the HEW audit was obviously biased in UEC's favor, and that in any event the State could not pay UEC because the 6-month statute of limitations had tolled because UEC had failed to file its claim agsint the State within six months from the time the claim had come due. Casey's argument, in its essence was that if the State's continuing negotiations with UEC, its statement that it would abide by the findings of the HEW audit, and its active cooperation with the HEW auditors had had the effect of lulling UEC into believing that the statute was not running, then UEC had been tricked and this was just too bad for UEC. We did not believe that this argument of Casey's would stand up in court, but in any event we had no alternative at that point but to engage new attorneys who would be able to handle the litigation on behalf of UEC, and to bring suit. We brought our action in the Pennsylvania Board of Arbitration of Claims where we obtained a favorable decision on the issue of the statute of limitations. However, the State appealed this decision to the Commonwealth Court and obtained a reversal. That put us in a very bad position because we could appeal this decision to the Supreme Court only with the Supreme Court's permission. We asked for their leave to appeal but were warned by out lawyer that the chances of getting this permission were extremely small and that we would have to find

ourselves new lawyers if we wanted to continue the fight. So, Joel Bernstein whom I was at that time helping get Adirondack Spring Water Company started, called a Harrisburg, Pennsylvania lawyer he knew from several years ago when we were negotiating with Harrisburg landlords, and asked him if he wanted to take on the suit. The lawyer, Ronald A. Katzmann was interested and took it for a 10% contingent fee, in 1975.

While we waited for the Pennsylvania Supreme Court to give us an answer regarding our request for permission to appeal, we initiated new efforts to settle with Pennsylvania and HEW. We began these efforts in 1976 and simultaneously asked the Supreme Court to defer consideration of our request for leave to appeal. We were afraid of a negative decision and would have preferred to settle on less than optimal terms just to play it safe and get some money. By mid-1978 all settlement possibilities were exhausted and we had no choice but to take our chances with the Supreme Court. To everyone's amazement, the Supreme Court granted us leave to appeal. We appealed, had the hearing, and soom afterwards were rewarded with a favorable decision on the statute of limitations issue. They reversed the previous decision rendered by the Commonwealth Court in a strongly worded opinion that reprimanded the State for their scurrilous conduct. That put us back before the original Board of Arbitration of Claims, on the merits of our case, i.e. the issue of whether or not we had performed the contract and were owed the money. The trial took place in September of 1979 and we felt, after it was over, that we had won easily. The State was unable to make any meaningful defense and fully expected to lose. Unfortunately, it took the Board of Arbitration of claims until April of 1981 to render their decision!! Fortunately, it was favorable and we were awarded the full $1432,000 with interest totalling about

$750,000. The State still had right to appeal that decision. First they said that they would, probably. But we respnded that we would then also appeal and demand much more money , they decided to call it quits and to pay us the $2,180,000. We got the money in July of 1981, almost exactly ten years after the time of UEC's original billing to the state. But the damage had been done: UEC had been destroyed; hundreds of thousands of dollars had been spent in litigation costs and other expenses; inflation had eroded the value of the money we were awarded; and I lost ten years that I could have spent far more productively. UEC owed me personally about $1,600,000 for loans I had made to UEC over the years, expenses I had paid on behalf of UEC, and back salary for time I had actually devoted to UEC during these past years. UEC may be able to repay me about $1,200,000 of that amount.

Adirondack Spring Water Company

In March of 1973, Joel Bernstein who had been corporate inside counsel for UEC Inc. and who had left UEC in 1971 came to see me. He wanted my help in financing his new venture, which he had started in 1971, and had called Adirondack Spring Water Company. He had springs in the Adirondacks, a very good label, but no money. At first I had no interest in helping him, as I was busy trying to keep UEC alive and to earn some money to bolster my own financial situation.

But in June of 1973, Joel was introduced to National Water Company which appeared already to have some momentum in the water business. I became intrigued by the possibilities and started giving Joel advice on how to proceed in exploiting this xxxx opportunity. National Water had a major contract relationship with Dailylea Cooperative Inc., a half billion dollar dairy cooperative with substantial bottling and distribution capabilities. I began to go with Joel to his negotiating meetings. Joel capitalized on my reputation as a successful businessman, promoter, and money raiser as he and I regotiated a xxxx 50-50 joint venture with National. A new corporation called Natural Spring Water Company was formed and National and Adirondack each owned half of it. Dairylea liked the deal because they saw it as added strength for their partner. Dairylea was eager to get into the water business xxxxxx because water sales held out larger profit margins for them than milk sales.

For my entrepreneurial efforts and role, I was to receive about 10% of the new company Natural Spring Water Company. Oscar Weitzberg too was promised some shares by Joel, as was a man named Chris Evers to had promised to invest $30,000.

During the shareholders' meeting at which the National shareholders voted on the x joint venture with Adirondack, Fred Kantor made a dramatic and unexpected appearance. xxxxxxxxxx It turned out that Kantor's friend from Columbia Wesley McCain,who had xxxxxxxxxxxxxxx helped persuade Kantor to turn against me, was a shareholder of National. McCain's and Kantor's joint attorney Burt Ahrens got up at the shareholders meeting and warned the shareholder against getting involved with mex on the grounds that I was discredited in the financial community. This happened at the same time as Kantor's denunciations of me to many of my other business associates, the IRS, the District Attorney, the Wall Street Journal, etc.x The incident apparently

did not influence the vote of the National shareholders, however.

Unfortunately, the President of National, who became the President of Natural, and his attorney, turned out to be dishonest. As soon as Chris Evers put in his $30,000, they withdrew it for what appeared to be personal expenses. They provided no financial reports to Adirondack, and went so far as to exclude Joel and Chris from the premises. I made vigorous efforts to raise money for Natural, but was fatally hanpered by lack of teamwork on Johnson's part. IN the meantime. the relationship between Joel and Johnson became one of near-enmity. In February of 1974 the main shareholders and directors of National offered an $80,000 total buyout to Adirondack, and when we refused this they sued us for "fraud". We countersued and went to court. In the courtroom, the judge, on questioning the attorney for National, discovered that Johnson and his associates had secretly "sold" the Dairylea contract to another company in which they were principal shareholders, leaving Natural as an empty shell. This explained their secretive, furtive and hostile behavior during the preceding months in which they had been secretly negotiating that transaction. Once the judge found them out, their goose was cooked, and Adirondack had very much the upper hand in the law suit. The law suit was eventually settled in 1976 with the assignment of the whole Dairylea contract to Adirondack, and the withdrawal of the National crooks from the scene. But the law suit cost Adirondack a lot of money, which came almost entirely from me. To induce me to fund the lawsuit, Joel offered me an equity participation in Adirondack equal to his own. Over the years, the funding of the law suit cost me about $50,000.

From early 1974, Perrier, the largest water company in the world, had been standing by with a strong interest in investing in our company. Once the law suit was settled, we resumed negotations with them. Perrier had bought Poland Spring Water Company in Maine, but Poland wasn't doing well. Perrier was intrigued by our concept of identifying and using springs located near our markets so as to minimize the major component of cost, namely hauling. In October of 1976 we formed a new company in which Perrier had a 45% interest and Adirondack had a 55% interest. The agreement was finalized in July of 1977, on the basis of which Perrier would make an investment of somewhere between $400,000 and $500,000 initially and additional amounts to be provided later without changing the

ownership proportions. At the same time, Adirondack was rengotiating its newly-acquired Dairylea contract, to correspond better to the new circumstances and opportunities.

Unfortunately, Perrier did no live up to their contractual obligation to invest the $400,000, probably due to internal politics within Perrier and alternatives being pushed by other Perrier factions. So, Joel sued them.and they quickly started talking settlement. But unfortunately the Chairman of Perrier, Jean Leven came to New York and was able to sweet-task Joel into dropping the law suit, by making him all kinds of promises none of which were kept. So, Joel was nowhere again and totally demoralized. He talked about quitting Adirondack and going back into law practice.

During the entire period from March 1974 through the end of 1978, Joel had no source of income other than the small amounts I paid him for miscellaneous legal services that he rendered to UEC, LRA, NTC, and to me personally. He took on my law suits against Kantor and the Wall Street Journal, and any-' thing else that came along. He used my offices, phones, secreterial services, and other facilities throughout that period. I have calculated that during that four-year period, my entire investment in Joel and Adirondack was over $200,000, excluding the portion attributable to legal services Joel provided. But this type of existence, functional as it was for the circumstances, was painful and somewhat humiliating to Joel who has a great deal of pride and a big ego. He had been expecting to be the big hero who made everybody else rich, and here he was depending on me for small amounts of money year after year. So, I had the additional task of propping him up every few months and dissuading him time and again from chucking it all.

In 1978 Joel found a new investor, Dick Ross, who invested $100,000 for 18% of NTC, early in 1979. I was prepared and able to bring three or four other investors into NTC for $25,000 to $50,000 each, namely Penna, Kemeny, Robert Nathan, and Larry Abrams; I actually had the check from Nathan. But Joel was, at that time, rejecting any further help from me, probably because he needed to finally assert his independence from me. He moved out of the office and took some space of his own at 42nd and Park. He asked me to turn away my investors, but finally still accepted Larry Abrams' $100,000 for 10% of Adirondack. The psychological problems between Joel and me soon passed, however, and it was not long before Joel and I were again on excellent terms. This occurred once Joel felt that he was once again in control of

Adirondack's direction and succeeding in doing what he was attemtping to do. One thing he did quidkly was to activate one of his springs and to start bottling at Dairylea's Goshen plant. He had hired a food broker who got him on the shelves of Waldbaum's 120 stores. The Adirondack water was almost immediately successful and its sales were comparable to those of the established brands like Great Bear and Deer Park in the Waldbaum stores in which these brands were available. Joel got much praise from many customers who had become Adirondack afficcionados.

Unfortunately, the magnificent Dairylea Goshen plant was closed two weeks after Joel had started bottling there. The enormous investment Joel had made in cultiaving his personal relationships at that plant and in setting up and debugging the production line was wasted. To try to comply with their contract, Dairylea sent Joel to a New Jersey bottling plant named Johanna Farms which also happens to be the plant that bottles the water of several of Adirondack's competitors. Joel was upset by this but had no choice as he had to fulfill his Waldbaum orders. But the arrangement proved unsatisfactory. Johanna Farms never had enough time for Adirondack's bottling requirements, caused serious delays, and once even mixed Adirondack's water with that of one of the other companies. More and more, Joel wanted to get out of the Dairylea agreement, which suddenly had become a liability, and to undertake bottling at a plant he could control. After prolonged negotiations with Dairylea, which proved unproductive, Joel brought a law suit against them for an antitrust violation (in forcing Adirondack to bottle with a competitor - Nestle, the owner of Deer Park) and for damaging Adirondack's business by impeding its bottling operations. Immediatley thereupon, the President of Dairylea entered into intensive negotiations with Joel, with promises of investment and big new joint undertakings. It also turned out, unbeknownst to Joel at the time he filed the law suit, that Dairylea had just signed a major contract with Nestle!

Nisenson Technology Corp.

I first met Jules Nisenson in April of 1977. Irving Bauer was "engaged" to Aviva Ziegler and was also a cousin of Jules. Irv said to me one day that there is someone to whom he wants to introduce me, and I would see why when I met him. Very mysterious. So, we met in my office at 1501 Broadway. After two minutes I had caught on that this was somebody who wants to raise money for his venture, like everybody else, and felt "had" by Irv. But a few mihutes after that, my view changed. Jules was telling me about his clutch in a way that caught my interest. He was totally immersed in the technical features and vitrues of his clutch, and was explaining these rather convincingly. When I asked him about himself, I quickly saw that this was a remarkable person. He had developed the original Saving Copier, the original Saxon Industries copier, a copier for Pitney Bowes, and numerous other important products during the ~~XX~~ 69 years of his life. My initial determination to get rid of Irv and Jules as quickly as possible became transformed into real fascination. Jules said that he needed $300,000 to bring the clutch to market, for which he would be willing to give the investor 75% of the Company.

Several meetings later, Jules and I agreed to form a company that would develop not only the clutch, but also a new copier that he had been thinking about and some other products he had on the back burner. We would divide the equity 60-40 in Jules' favor, and I would play the role of the business partner. That role included money raising.

I immediately began to work with ~~Jules~~ Jules in the development of a business plan that could be presented to investors. ~~Jules~~ Jules provided me with some of the manufacturing and marketing assumptions, and I generated the business plan. It took the balance of the year to complete the plan. During that time, I had to guarantee personal ~~loans~~ loans for Jules totalling $30,000 to enable him to live during that period, as he had no salary. Jules did, however, continue his work on the clutch and copier during that period.

I presented the business plan to several possible investors but was unable to obtain commitments. Venture capital was not in vogue during the period 1977-78. Chyron almost provided us with the financing, but changed their minds at the last minute when they suffered an unexpected balance sheet setback.

The one person whom I was able to persuade to invest was my Brazilian client and friend, Luiz Felippe Penna. Penna was the President of the Rio finance company called LETRA, and also a congressman from Rio. He had invited me to his house for dinner many times, and in January of 1976 Vicki, Linda, and I had made an overnight boat trip with him and his family on his sailing boat in the bay of Angra dos Reys. He had also visited us several times in New York. I offered Penna the same percentage of the Company that I would own (28% each) for an investment of $150,000. That deal was closed in September of 1978.

Jules thereupon set up a development laboratory at 43 W 61st Street in Manhattan. He hired a technican, a machinist, and later on Marty Waine. Marty Waine was my sister Joan's first husband and father of Nancy Cooper. Marty had worked for me at Columbia Univeristy when I was still a graduate student there. He was at that time in the Physics Department and helped me with certain lab equipment problems. I remembered him to be a brilliant engineer, an excellent scientist, and a very hard and honest worker. It turned out that he had lost none of these qualities over the years in which I had not been in touch with him. He resurfaced as a result of Nancy's tracking him down in Maryland as a result of curiosity about her father plus some prompting by me.

In February of 1979, Dr. John L. Kemeny made an investment of $100,000 in NTC for 10% of the common stock. Kemeny was a retired psychiatrist, had made some money in real estate, and was looking for something meaningful to become involved in. He became fascinated with me and convinced that I was the key to his future happiness. He wanted to move to New York (from Florida where he had been residing in luxurious style) and to work with me in all my ventures. So, he sold his palacial apartment in Florida for $375,000 and invested some of the proceeds in NTC and in TeleSession, $100,000 in each. He wanted to invest more but I dissuaded him, feeling that a larger investment would be too large for his means, considering that there was risk. Kemeny asked whether he could stay in my apartment for two or three months while he looked for a permanent New York residence at his leisure. I agreed. Little did I suspect that this two or three months would stretch into eighteen months, at the end of which I would have to apply substantial pressure to get him to move out. But in February of 1979 I had high hopes for my relationship with Kemeny, and he became a Director of NTC and TeleSession.

Immediately after making his investment, Kemeny introduced me to some wealthy individuals whom he had gotten to know in Florida, as potential investors in the copier venture. My strategy from the beginning had been to spin off subsidiary companies for each of NTC's product groups, such as electromechanical components or copiers, and to finance each one of these subsidiaries rather than further dilute the parent company NTC. I wrote a business plan for the copier venture and showed it to four or five potential investors, several of whom expressed a strong interest in funding it. One company made us a written offer of $3,000,000 for 60% of the copier venture. But our presentation to investors was always predicated on a closing after the prototype of the copier was finished and demonstrable. Jules assured me early in 1979 that this was only weeks away. Then he set May as the date. Then June, Then July. Then August, and so on until the present time, March 1981. According to Jules, the demonstration unit is still a month or two in the future. As a result, the copier venture has not yet been financed.

In 1979 I developed a business plan for an NTC subsidiary that would commercialize the eletromechanical components including the clutch, and called it General Clutch Corp. (GCC) Of all the investors I approached with that plan, only Bedford Stuyvesant Restoration Corp. showed real interest. They obtained their funds from the Federal Government to finance companies that would establish manufacturing and create jobs in the Bedford Stuyvesant area of Brooklyn. But by February of 1980 BSRC still had not received their federal grant money, and NTC was out of cash. Penna and Kemeny had lost their financial staying power and were unwilling to put any more money into NTC, on any terms. So, I was forced to put in money myself. From February 1980 to March 1981 I put in a total of $150,000 which brought my NTC ownership to about 37%, and I was also able to persuade Larry Abrams to invest $43,000 in NTC on the same terms during April and May of 1980.

Throughout 1980, we tried to find other investors. In August of 1980, Kemeny introduced me to ABC Corp., a trading company backed by Arab capital that was seeking to expand in the U.S. They seemed highly impressed with me and my associates, and enamored with NTC and its prospects. Negotiations began in earnest in November of 1980, and a deal was struck in early December. They were prepared to invest $1.1 million as equity for 26% of NTC. In addition, they were to be our overseas sale agents. Those terms were to be signed in January of 1981, after more than one month of almost daily arduous

negotiation between the President of ABC Corp. Mr. Mahmoud Takieddine and myself. The deal was never closed. Kemeny unintentionally derailed it. About ten days before the documents with ABC were signed, Kemeny called from Arizona, where he had been living, to say that he would withold his approval of the deal with ABC (which he could legally do) unless he was paid a 5% finders fee, which he falsely claimed had been promised to him by Nisenson and possibly also by me. After about ten days of almost daily telephone negotiations between Kemeny's lawyer, Kemeny, and me, Kemeny agreed to give his consent to the ABC deal, and to resign from NTC and from TeleSession as a Director, if I paid him $10,000 cash for an option to buy him out for $200,000 from both NTC and TeleSession. That option agreement was signed and the $10,000 check delivered on the same afteroon as the ABC/NTC investment documents were signed. When I told Takieddine about the Kemeny drama and option, he became extremely upset, even though I had offered to immediately transfer the Kemeny option to NTC. He was obviously galled by the fact that ABC had not gotten to exercise the Kemeny option (whose terms were more favorable than those he was paying). He thereupon insisted on an opportunity to renegotiate the whole deal, even though the papers had already been signed. On the next day, Takieddine and an associate came to my house in Chappaqua with Marty Waine also present. Takieddine expressed the sentiment that he had not been treated with openness, but soon betrayed his true motives. He suggested that we liquidate NTC, and form a new company of which ABC, Nisenson, Waine, and I would be the only shareholders. Penna and Kemeny would be bought out for a small amount of money, much less than I was proposing to give them. I stated that this would be at best highly unfair to Penna and Kemeny, unethical, and possibly illegal. Next, Takieddine proposed putting much more than $1.1 million into NTC for a larger percentage. But in my own mind, the deal was crumbling, because it had become evident to me that Takieddine was bent on obtaining control of NTC while revealing his substantial disregard for the rights and entitlements of others.

During the summer of 1980, Vicki (through her firm OmniQuest) had identified for GCC the main potential customers for an innovative type of window shade hardware that Nisenson had developed. We wrote letters and made presentations to these companies and one of them, Joanna Western Mills entered into a contract with us on March 2, 1981 after four months of intense negotiations. Under the contract, we were to deliver 50,000 units of the

hardware for $120,000. The units were to be used by Joanna for a market.test. If that test is successful, Joanna would be committed to procure all of its subsequent requirements for the hardware from GCC, which could amount to millions of units per year..The signing of that contract was a major milestone for NTC.

During the period from February 1980 to March 1981 We continued to negotiate with Bedford Stuyvesant. In December of 1980 they finally received their grant from the federal agency and approval of for an investment of $300,000 in GCC. We settled on terms that provided them with a 17% equity interest in GCC for their $300,000 plus GCC commitment to establish its principal manufacturing facility in the Bedford Stuyvesant area of Brooklyn.

As soon as the ABC deal failed to close, I resumed my efforts to raise some capital for NTC to be used for additional developmental work on the copier and for buying out Penna and Kemeny. In March of 1981, as soon as the contract with Joanna was signed, we hired an additional engineer who had previously worked for Martin Waine and whom Marty described as "probably the best mechanical engineer in the world", Ed Rudyx Rude.

A few days after his arrival at NTC, Ed Rude thought of of a new application for our clutch: Screwdrivers and nutdrivers. He pointed out that we could develop a screwdriver that worked like a ratchet screwdriver except that it would be silent, smaller, easier to erverse direction, and possibly cheaper. We quickly became very enthusiastic about this product possibility and undertook the market studies required to make the decision as to whether or not to proceed with its commercialization. We made a prototype and went to show it to ACE hardware, True Value Hardware, J.C. Penney, and IBM. All xxxxxxxxx expressed great interest stating that they would distribute it or in the case of IBM test it for possible use in the field force. A So, we decided to proceed to engineer and tool it.

In April, May, and June of 1981 we also developed new adaptations of our clutch for mini-blinds and woven blinds, including a new headrail mechanism. I went to Stockholm to show it to the Swedish company PERMA System and to Hunter Douglas Corporation in Rotterdam. In August, Marty Waine and I went to the Kirsch Company and presented the hardware to them, and in September Jules, Marty and I presented it to Levolor. PERMA, Kirsch and Levelor expressed considerable interest in entering into contracts with us under which they would incorporate our hardware into their products.

My work in science and technology

As an adolescent, I was deeply preoccupied with such problems as the relationship between reality and perception, the conditions of knowing, and the meaning of life. For a time, I sought answers to these burning questions in philosophy, Freud, and chemistry. It was not until I took Nagel's epistemology course at Columbia and Keller's course in experimental psychology and then Schoenfeld's course, all in my junior year, that I saw any hope of approaching these kinds of questions in a way that made sense to me. So, I decided to make experimental psychology my career, because it was the science that held out the answers I was seeking. My father was rather traumatized by this decision as he had assumed all along that I would follow him into medicine. But my decision was firm.

I was accepted as a graduate student in the Columbia University Psychology Department and immediately took a Research Assistant job on an Army contract dealing with Morse Code learning. My boss and the project Director Donald A. Cook quickly allowed me to take charge of the entire project -- its operation, data collection, data analysis, and preparation of reports. In consultation with him I also reoriented the project's objectives to encompass an information theory analysis of the sequential structure of English following the then-new work of Claude Shannon. When that project ended I was offered a new and better-paid position as Research Associate on an Air Force project whose objective was to determine the effect of alpha tocopherol (Vitamin E) on resistance to hypoxia -- specifically on the deterioration of various types of behavioral performance under hypoxia. The Directors of that project wereRobert Berryman and Prof. Fred Keller. Again, I was immediately given a free hand and total responsibility for carrying out the project. By that time I had acquired a reputation as someone who solves the problems that come along and who does whatever is necessary to get the job done.

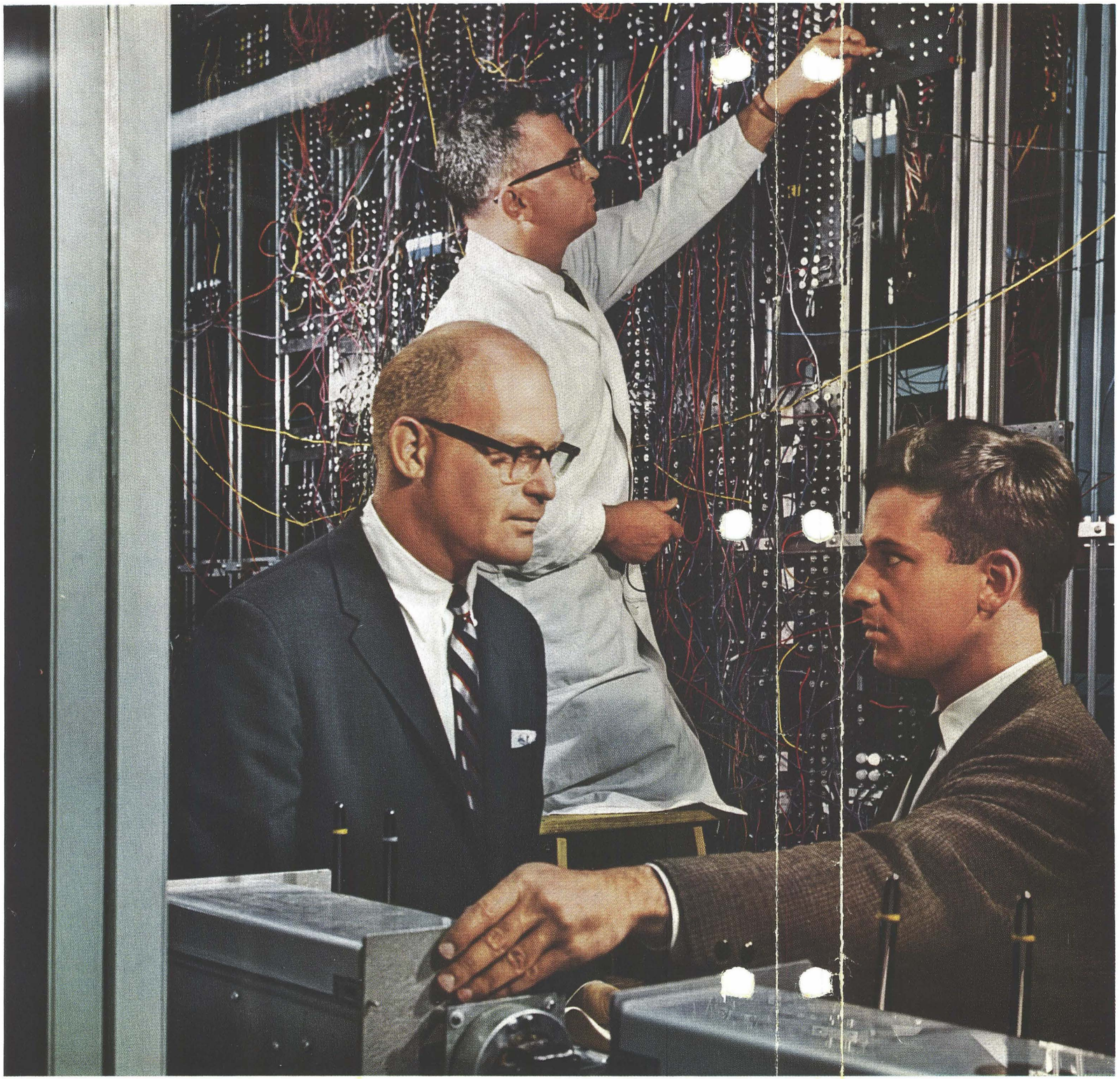
The main challenge in that project was to devise procedures that would make it possible to measure, in rats, performance indices that would correspond to subtle disorientation or deterioration far short of total behavioral disorganization. First, I decided that we needed a measure of discrimination of response-produced cues such as occurs in counting, and a measure of avoidance behavior of the type that occurs in vehicle operation or danger avoidance of any type. I spent an entire weekend from Saturday morning through Sunday night in seclusion doing nothing but thinking about the problem, and by Sunday night I had developed the counting procedure which became the subject of my research activities for the following six years. I quickly built the circuits that administered the procedure (the rat receives a drop of water each time it presses bar A at least n consecutive times before pressing bar B) and trained several groups of rats using 4, 8, 12, and 16 as the values of n. The number of times they pressed bar A before pressing bar B was our measure of the accuracy with which they counted. My next task was to build all of the required equipment -- special cages that allowed automated water drop dispensation, two-bar performance, and avoidance behavior measurement. I designed and built ten such cages, working days, nights, and weekends in the machine shop for several months. I also designed and built the relay circuits, the behavior measurement apparatus, and the system for systematically varying, in controlled ways, the oxygen levels the rats were breathing during the test sessions. After six months of almost continuous work I had the entire system working and the experiments were initiated. The rats received Vitamin E -free food, and I gave them various levels of Vitamin E supplementation ranging from zero to overdoses. The entire experiment was successfully concluded, on schedule, and the results were published by the School of Aviation Medicine.

During the same period of time, I was also working on my Ph.D. dissertation. In order to be failsafe, I did two dissertations at the same time. One was the counting procedure I had developed for the Vitamin E project. The other one was an experiment to demonstrate how superstitious behavior becomes increasingly stereotyped with each successive cycle of extinction and reconditioning. I built a special cage in which a pigeon's movements could be filmed through a calibration grid so that the pigeon's movements could later be quantified and graphed. The pigeon sat on a perch from which he could not descend comfortably because the perch was situated on top of a pyramid whose base coincided with the edges of the cage's vertical walls. Superstitious conditioning was produced by repeated unconditional presentations of a grain hopper at the end of ten-second periods in which a light was on. The experiment was a great success. One of my more devoted students, Diane Roberts, volunteered to do the tedious job of analyzing the thousands of movie film frames and plotting the pigeon's movements on graph paper. The hypothesized effect was clearly demonstrated in the graphs. So, I had the luxury of choosing between two excellent Ph.D. theses. I chose the counting proce

In 1953 I accepted a teaching assistantship in the experimental psychology laboratory course offered in the School of General Studies. The professors were Notterman and Carey. But Prof. Carey often failed to show up for his lecture, always without notice. Each time that happened I would get up in front of the class and give a lecture of my own. As Carey's absenteeism worsened, I ended up giving virtually all the lectures. I could not have received better training in extemporaneous lecturing, and it was an open secret that the students preferred my lectures to Carey's. So, the following semester I was given Carey's job plus one additional section of the same course. Fired up, I redesigned the course and breathed new life into it. I eliminated the tradition-motivated but pointless experiemtns and added some

new experiments that the students were able to perform successfully with the available laboratory equipment. I also introduced new course content that was more responsive to the students' interests and that covered some of the more important theoretical advances of the preceding decade. I taught two sections (5 points per section) of that course for the next four years. My sections were always oversubscribed as I was reputed to be the most stimulating lecturer in the department. I communicated my own enthisiasm for the subject and conducted my classes in a highly interactive manner.

In 1956 I was offered a research job at Schering Corporation. I was to develop a modern psychopharmacology department in which drugs with potentially valuable behavioral effects could be screened in animals. I quickly determined that a cost-effective laboratory in which an appreciable number of drugs could be screened would require significant automation and the possibility of testing large numbers of animals with minimal human involvement. So I designed the "rat rotor", a circular enclosure with eight sector-shaped compartments to hold eight rats. The structure would rotate periodically, positioning each rat in front of the work station for the programmed length of time. At the back of each sector-shaped cage were electrically-actuated food and water dispensers. I hired an engineering firm to build me twenty of these units, and they worked like a dream. The electrical control circuits controlling the twenty simultaneously-ongoing experiments were located in a nearby control room connected to the rat rotors by multi-conductor cables. The data were recorded on electronic counters and pen recorders which were periodically photographed by an automatic camera and then reset. All data were also recorded on a magnetic tape which could be processed by a Control Data 205 computer.



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Schering's Dr. Francis Mechner (*right*) explains an experiment to Lew Young in the operant behavior laboratory's control room. This elaborate apparatus can automatically control and record 20 simultaneous experiments on rat, monkey and human subjects.

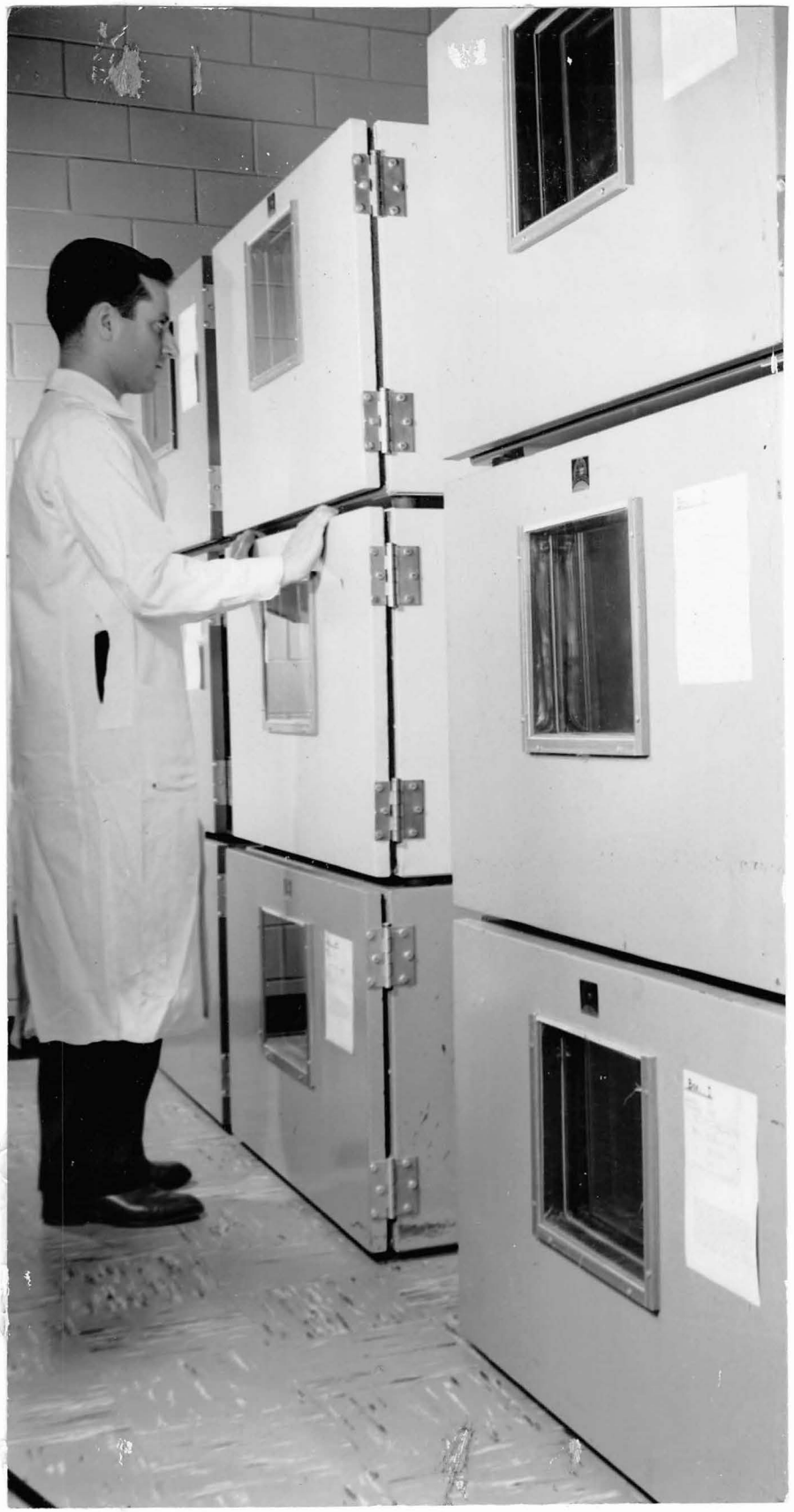
The computer analyzed the recorded data according to my pre-programmed specifications. This was in the days when computers were still an esoteric novelty, not widely used at all. The computer was the Burroughs ~~Datatron~~ Datatron 205, a relatively powerful machine for those days. The entire computer installation filled an air-conditioned medium-sized room with a false floor for running cables between the many separate consoles. The points on my graphs were digits printed by the computer's printer, and the positions where they were printed corresponded to the calculated ordinate and abscissa values. Every day I received several reams of such graphs. The most complicated part of the system, however, was the data recording system which recorded not only every response made by every animal in the entire laboratory, day and night, but also all of the necessary identifying information as to which animal it was, what drug it had received, the type of behavior or procedure used in the ~~experiment~~ experiment. This equipment was built to my specifications by Digitronics Corporation whose President and founder was Eugene Leonard, my future partner in Systems Resources Corp. It was Digitronics' first contract after it was founded by Gene, and Schering paid him about $120,000 for it.

In addition to the 160 rats in the 20 rat rotors, I also had half a dozen work stations (special cages) for monkeys, to enable me to make comparisons between the behavioral effects of drugs in different species. I also felt a strong need to obtain comparative data in human beings. So, I applied for a grant to the National Institute of Health in Washington. They gave me a contract to set up a human extension of my laboratory. This was rather unusual, as the NIH would normally have a taboo against giving money to a drug company. They did it only because of their interest in my work and what they considered its theoretical importance. So, I added two work

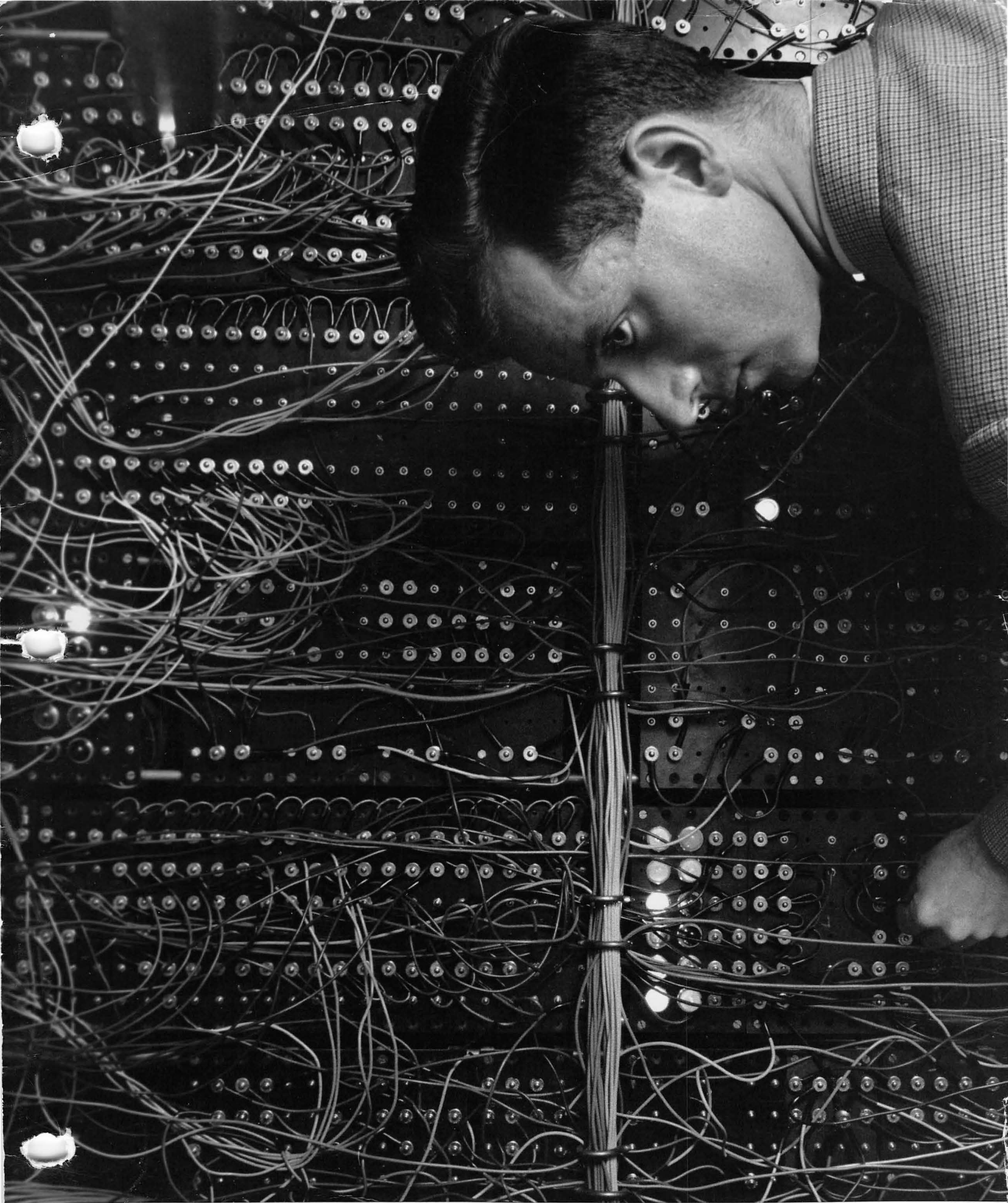
stations at which retired old ladies performed under the same experimental procedures (counting with the two-bar procedure, time estimation, etc.) as the rats and monkeys, under the influence of the same drugs. An interesting side-discovery was that human beings are about as accurate as rats or monkeys in counting and time estimation when they do not count verbally or use time measuring devices.

My laboratory at Schering was widely known and admired, and I had to handle a continuous stream of visitors from all over the country and the world. Many of them came because they wanted to learn and adopt my techniques and build similar equipment. Some of my equipment continued to be manufactured for many years and sold by the engineering firm that originally built mine, and I received a royalty from them of ~~$600~~ 200 for each rotor they sold.

During the years in which I operated the laboratory, I developed many new behavioral procedures for measuring subtle aspects of animals' (or human beings') behavioral functions, measures that could be described as "time estimation", "optimism", "patience", "avoidance ability', etc. By using dozens of combinations of such indices, I was, in effect able to provide a kind of "fingerprint" of the behavioral effects of any drug. These procedures were programmed and administered by complex relay circuits that I personally designed and wired up. Each experiment or work station had its own relay control system. The entire laboratory had over 10,000 relays, 400 stepping switches, and 200 timers. The drug administrations and operation and maintenance of the laboratory was done by my staff which consisted of Dr. Arthur Snapper of Columbia, Ronald Ray also of Columbia, Larry Guèvrekian, and Milos Latranyi. All four were superbly competent and hard-working people. When I subsequenty left Schering, Snapper took over and some years later he was in turn replaced by Latranyi. I also enjoyed a continuing stream of



Francis Mechner, 1959



Francis standing in front of stepping switch panels on his relay computer. This is the computer that programmed the experiments and transmitted data to another computer with which the data were analyzed and processed. Schering Corpoation Behavior Laboratory, 1960

free volunteer labor from the Columbia psychology department -- people like Stuart Margulies, Dr. Balaraman, and others. The period in which I built and operated that laboratory was perhaps one of the most joyful and satisfying ones of my life. By 1960 I accumulated notes and data for 24 publications and it is one of my great regrets that only three ~~of these~~ of these were actually published, thanks to Vicki's help in 1961 -62. The others fell by the waysaide and were relegated to drawers as my time, energy and thought was drawn away by Basic Systems starting in September of 1960.

On the theoretical side, I developed a concept which I called the multi-response operant. In psychology an operant is a repsonse that operates on the environment. Until then, responses had always been recorded and measured as instantaneous events, such as the pressing of a bar or pushing a button. I proposed the idea of defining a response as a complex sequence of prescribed and organized learned behavior, with a beginning, and internal structure, and an end. By defining and recordeing an operant response in this way, it becomes possible to study its internal structure, and not just its occurrence or non-occurrance. The procedures I developed in my laboratory made this approach possible. My "multi-response operant" concept swept the Columbia psychology department quickly, and many of the graduate students began to design their Ph.D. dissertations and research around it. It is, in fact a powerful concept that opens up many new avenues for behavioral research. Unfortunately, Prof. Schoenfeld perceived my multi-response operant concept as a personal threat to himself, and me as a rival for theoretical leadership among his graduate students. He wanted his graduate students to be <u>his</u> followers and to get excited by <u>his</u> ideas, not by mine. Many professors use their graduate students as indentured research servants to do their research and write up their publications for them, and Schoenfeld was no exception.

Schoenfeld strongly urged me not to publish a fine paper I had written on the multi-response operant (and like a fool I agreed not to) and viciously punished any mention of the concept by any graduate student of his within his hearing range. The result was a clandestine underground "multi-response" culture in the psychology department, the extent of which I only learned years later, and in which I had no personal involvement. Schoenfeld was doubly galled by the sedition that was taking place among his graduate students by my ideas, and by the fact that I was doing nothing to encourage it while he was failing to obtain the kind of following that I was obtaining without seeking it, and that I was on top of all that a renegade who had turned his back on the academy in favor of private industry. I was quite saddened by the situation as it ruined by relationship with Schoenfeld for whom I had always had very high regard.

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The other important piece of theoretical work I did during that time, actually during the Spring of 1958, was the development of a notation system for behavioral contingencies. I knew that there was a need for such a system and felt confident that I could develop one. So, when I received an invitation to give a lecture at a psychology conference at which Skinner and many other important psychologists were also scheduled to give papers, I gave as the title of my projected paper "A Notation System for Behavioral Contingencies". It took me several weeks of mind-bending work to come up with a system that did the job, but when it was done, I knew that I had accomplished something significant. The paper was extremely well received and much praised. I published it in the same year and it received a fair amount of use, with some psychologists even using it as a teaching tool in their courses. About 19 years later I found that it was being used in Brazil. A few years later I worked with a graduate student in the Columbia Sociology Department to extend the system to the analysis of social interaction contingencies such as cooperation, competition, blackmail, economic transactions, etc. After Vicki came on the scene and programmed instruction had become available as a teaching tool, Vicki did a magnificent job of developing an instructional program for teaching the notation system. She tested it but stopped there.

During that same period of time, I continued to teach my experimental psychology course at Coumbia. I taught ten points per semester, evenings and saturdays -- almost a full-time teaching load. For a time, this gave me great satisfaction as it provided me with a medium in which to develop my own ideas. The main attitudes I tried to instill in my students were (a) rigorous dedication to observation and measurement rather than preconception or speculation; (b) attention to precision and detail in presenting arguments, procedures, discussions, or ideas; and (c) acceptance of one's own mistakes or ignorance, i.e. "not knowing" as an acceptable state. I had personally spent much time studying philosophy of science (operationalism, positive empiricism, etc.) and thought it highly profitable to transfer and apply these attitudes and ideas to the study of behavior. I was effective in teaching these attitudes because I believe that I exemplified them personally, in my own work and in my lectures. My students sensed this and the better ones among them became "converted" to my approach to behavior research. Many of my students during those years became fine research psychologists, including Stuart Margulies and Irving Goldberg both of whom later also became my associates in Basic Systems Inc.

I asked my students to design experiments from the first session of the course. I taught them that the final objective of any experiemtn is a graphic or tabular presentation in which recorded measruements of data are presented -- the dependent variable or behavior on the ordinate, and the independent variable on the abscissa. I also taught them about experimental and control group comparisons, the importance and methods for controlling undesired or contaminating independent variables, and the statistical treatment of the data for drawing conclusions. Every week they actually did an experiemtn in our laboratory. I gave few or no tests, but many challenging assignments which had to be handed in on time. The lectures were conducted like seminars or discussions.

In 1959 I began to become interested in instructional technology. I was impressed by Skinner's two articles proposing "teaching machines" and immediately came to the conclusion that no machine was necessary to implement that idea. I believe I was the first to propose and develop an instructional program that did not use a machine. I tested the idea with a short algebra program suitable for twelve year-old children that I wrote. Encouraged by the results, I developed additional math programs and began to toy with the idea of publishing and selling them to the schools. In spite of having taken quite a few math courses at Columbia, many of them at the graduate level, I found that this exercise required me to relearn and rethink the axiomatic structure of algebra so that I would know in what order to introduce the axioms in the program.

Once I had started Basic Systems and confronted the task of creating a production system for high-quality instructional programs, I began to devote substantial effort to the problems of instructional technology. In a matter of several weeks, I worked out the main phases of the production process and the basic ideas of behavioral analysis as it applied to the teaching of scientific subject matter. Of course it took me several years of additional work to get really clear on the use of behavioral analysis in the development of instructional systems. I wrote a series of pamphlets on various aspects of programmed instruction and methods for producing programs that are effective. These were intended primarily for the programmers I was training. When Skinner saw them he described them as the first thing he had seen in the field of programmed instruction that made any sense.

Much of my innovative work in instructional technology during the years 1960 to 1965 was the result of technical challenges thrown at me by clients.

For example the program I did for Schering on Diagnosing Myocardial Infarction by Electrocardiogram used diagrams for the first time, and responses involving something other than writing words -- a technique that could not easily have been used with Skinner's teaching machine. Then, for Pfizer, I responded to the challenge of developing training systems for salesmen by inventing the audio-lingual technique, which involves the presentation of audio-taped dramatized episodes to the trainee, with the trainee being required to give a spoken response of the type that would be called for if the trainee found himself in the dramatized situation. The first two programs that were developed with this audio-lingual technique were"Effective Listaning"and (as it was later named) "Professional Selling Skills". These two programs became Basic Systems' and later Xerox Learning Systems' biggest sellers. In fact, Professional Selling Skills in Xerox's hands soon became the largest selling and most widely-used training system of all time, and still enjoys that status today 18 years after it was first developed.

Once I had taught everybody at Basic Systems how to develop programmed instruction courses, it became impossible for me introduce significant changes in the technology. The way I had taught them to do it originally became their dogma. For example, it occurred to me early in 1962 that programs could often be made much more effective if the correct answers were left out, with the student having to get his feedback by reviewing the early portions of the program in which the information was first taught. My programmers couldn't accept that and argued vehemently that our customers wouldn't accept that. I had to wait for eleven years until my 1973 contract with Pfizer before I could implement this advance in the technology, and then in Brazil I installed this technique as the basic one.

But the most important work I did during the Basic Systems years, in my opinion, was the development of behavioral analysis. I first published my behavioral analysis method in a paper I gave called "Science Education and Behavioral Technology" at an NEA symposium at which Skinner and other important psychologists also gave papers. I published the same ideas again in a more polished form in an article entitled"Behavioral Analysis and Instructional Sequencing." But I also recognized that this work would not find its way into the mainstream of instructional technology unless I did something additional to put it there.

That opportunity presented itself to me in Brazil. Once I started EDUTEC and also trained cadres of behavioral technologists in other Brazilian institutions such as CENAFOR and the Federal University of Rio de Janeiro, I had the opportunity to teach them to apply this behavioral analysis methodology in their instructional programs. A second and more important opportunity presented itself in my relationship with the Army Research Institute and the Army Training Development Institute. In 1979 I signed a contract with ARI for the development of a course to teach behavioral analysis to Army analysts whose job it is to analyze the counseling, coaching, and leadership skills that sergeants need. The resulting course, completed in 1981 was the first time I presented my behavioral analysis methods in a form that allowed them to be learned and applied.

My work with the Army Training Development Institute dealt with the implementation for the Army of my process for developing training systems with special emphasis on my task analysis techniques. Task analysis is the phase that precedes behavioral analysis. In Brazil and previously, I had developed a 20-step production process for developing training systems, and the Army was interested in adopting and implementing my process.

Enrepreneurship

The preseding sections are basically the stories of my various business ventures. But the specific events that comprise these stories are not as significant to me as the things I learned from them about the process of making desired things happen, about people in general, and about myself. So, to complete the story of my business endeavors, I feel that I must say a few things about these points.

In business endeavors, my main satisfaction has always been the successful implementation of an idea, especially when the idea is technolgical, scientific, and new. I have always found it far more satisfying to see an innovative idea adopted and producing practical results than to see it in print with my name on it. For example, when I started Basic Systems and for the following ten years, I devoted far more time and energy to teaching my associates and employees how to do behavioral analysis and how to develop programmed instruction courses according to my methods, than I did to writing about them and publishing them. I have often been criticized for this tendency by my friends and colleagues, but I feel that the practical implementation of an innovative concept or method in a way that results in benefits for society, is more likely to bring about the cultural perpetuation, dissemination, and longevity of the concept than its mere communication to others. It's not enough to cook a good meal for society; you also have to convince it that it tastes good, by getting it to eat some. In the free enterprise system, the private corporation is the natural vehicle for the perpetuation of concepts, more so than the book, treatise, or lecture. That is why I have always regarded technological entrepreneurship as one of the most valuable and creative things one can do if the motive is to benefit society and humanity in the long run. It

goes without saying that value to society of any particular corporation one launches depends on the nature of the concept, product, or service for which the corporation serves as the carrier and transmitter, and these must be chosen with great thought and care.

In rereading the above paragraph I notice that I did not mention money. This is indicative of my attitude toward money in connection with business. My attitude towards money has three components: The first and most important is that it serves as fuel for corporations and projects -- it is needed to enable them get started, to run, and to grow. The second is that money is an indicator of a venture's success and health. It is the form in which society provides feedback to the entrepreneur and the venture's managers. The third component of the significance of money for me is the fact that it provides me with freedom of action and options to do the kinds of things described in the above paragraph.

Having been an entrepreneur for 21 years and having launched numerous new ventures in those years, I have evidently learned many principles that can be applied to entrepreneurship in general , and that are generally not to be found in most books on the subject. I have not attempted and do not plan to attempt to formulate all of these, but a few of them are worth mentioning here in passing.

In thermodynamic theory there is a principle, which is mathematically provable, that to get the maximum efficiency from a thermodynamic system, run it at 50% of its theoretical maximum capacity. I have found this principle to be applicable in business too, both in deal making and in what one demands of organizations or relationships. In other words, one gets the best results if one demands or settles for half of the maximum that one might be able to get by forcing things to their limit.

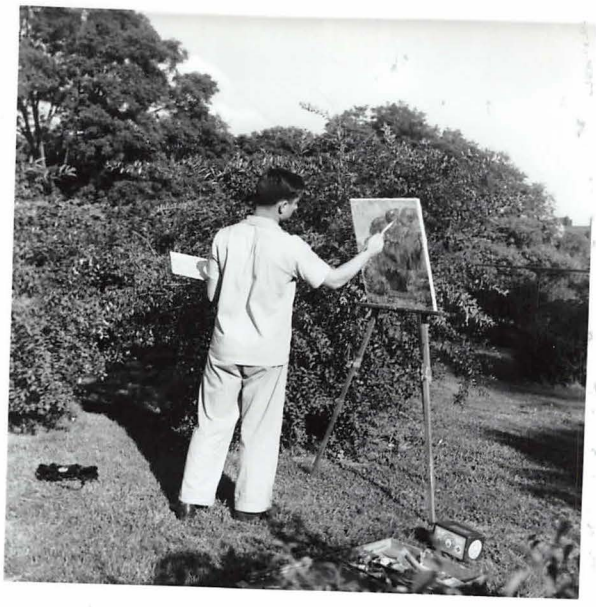
Then there is the moralistic-sounding principle which could tritely be stated as "honesty is the best policy". But this is more than a moral dictum, it is a pragmatically effective business strategy and principle. Honesty works best in the long run even when the short-term consequences of honesty and openness seem highly disadvantageous, as they often do. The consistent practice of honesty and openness gradually increases the loyalty and trust that others place in the entrepreneur, and even more importantly, it facilitates the entrepreneur's own decision processes and choices.

Perhaps the most important category of a continuously recurring problem is that of predicting what a person is capable of doing and will in fact do in a given situation. This problem occurs in hiring people, assigning work to people, or forming business associations. The one principle to apply here is to predict the future behavior and performance of people on one basis only: What they have done in the past. The only reliable index and predictor of future behavior is past behavior. I have observed, to my sadness, that neither I nor anyone else is successful in predicting the future performance of people on the basis of interviews, personal impressions, test results, appearance, recommendations, "vibrations", or other non-historic indicators.

In designing any complex system, such as an organization, it is of vital importance to install feedback loops that feed information from the points where the information is generated to the points where it is needed, as frequently as possible. This much is as easy to agree with as motherhood, but what is difficult to understand is that the installation of such feedback loops is normally resisted and undermined by the organization in

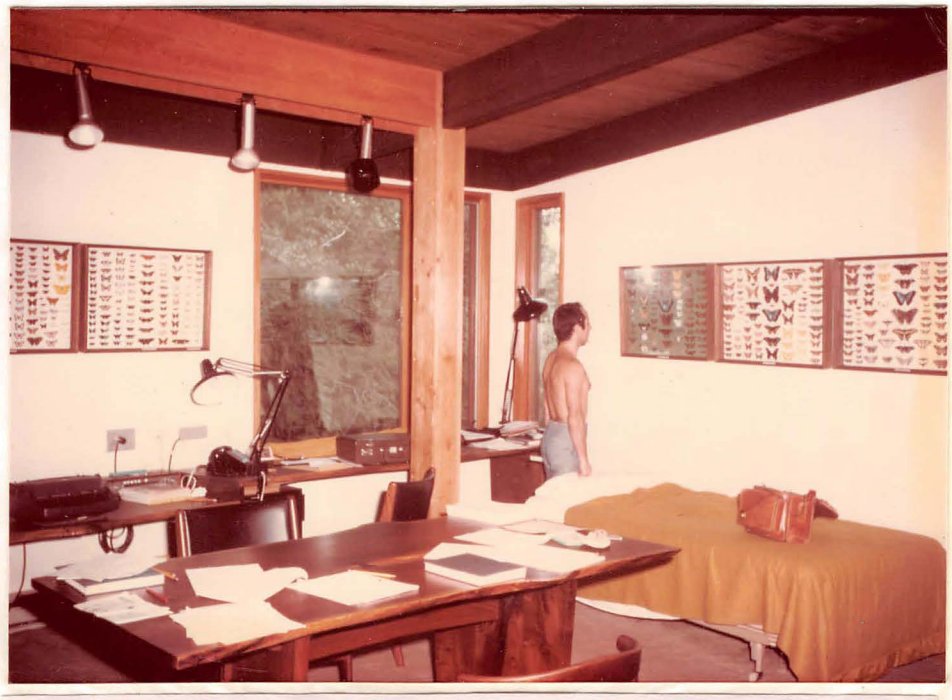
which they are installed. The reason for this is that feedback loops that don't follow the official organizational lines and even many that do pose a threat to the generator of the data or information, and a burdensome challenge, or irritant, to its recipient. Since information bestows power in an organization, feedback loops reduce the potential power of individuals in the organization who are by-passed by the loops and who without them might be in a position to manage the information for their own ends. Difficult though it is, the installation of such feedback loops is always essential to the successful functioning of an organization as a whole, and must therefore be pushed through at all costs, even when the resistance is strong.

But the most important business principle by far for an entrepreneur is one that pervades all human endeavor: The importance of tolerating and accepting the state of not knowing and lacking information. The state of ignorance is always painful, uncomfortable, and sometimes embarrassing. However, only in that state is one motivated and disposed to seek information, to gain better understanding, and to learn. The most dangerous trap is that of believing that one knows or understands when one actually doesn't. It is extremely advantageous to be able to explicitly and coldbloodedly face one's own ignorance and knowledge gaps, regardless of discomfort, when judgments and decisions are made. In business as well as in other life situations, decisions are always made with incomplete information and understanding. Incompleteness is a matter of degree only.



Francis on one of his painting excursions i Prospect Park in Brooklyn.

Francis looking at his butterflies in Vienna.



Francis looking at his butterflies in Chappaqua.

Some of Francis' great many paintings

Art

Drawing and painting was my main hobby until I was about 20 years old. As a child, I spent much of my time drawing, usually animals. This was, of course, due to my father's interest in animals. In France, at the age of seven, I became quite interested in cars and for a time these replaced animals as my favorite subject. At the age of eight, I discovered the impressionist technique as a way to achieve effects. This is illustrated by the two drawings of the beach and ocean in La Bernerie, with the Ile Noirmoutier in the background. Until my arrival in Havana at the age of 10 I became increasingly interested in landscapes , partly because of my love of nature and partly because of the challenge they posed.

In Havana, at age 10, I met Bernard Reder (on the boat coming over) and he immediately adopted me as a student-apprentice. I would go to his sculpting studio-garage almost daily and work with plaster of Paris or charcoal, making either animals or imitating his style of making plump nudes. There, one day, I met Solomon Lerner, the painter. It did not take Lerner long to steal me away from Reder. Lerner thought that I had a big talent and felt that only he would know how to develop it in the right way. Reder, he said, was a "faker" more interested in producing shock effects and showmanship than in honest art for art's sake. I believed him to be right then and still do today. In any event, Lerner began to come to my house daily for three hours each day (without receiving any fees). He walked because he could not afford the carfare and rarely missed a day. He taught me to size the cardboards and specified the materials I (i.e. my father) should buy. (Alizarin crimson, viridian green, ultramarine blue, chrome yellow, zinc white). He would sit behind me and coach me brush stroke by brush

stroke as I painted. He stressed clean colors (never mix more than three colors for any one brush stroke), painting the colors that were there, rather than preconceptions, not passing the brush twice over the same area if it can be avoided. The subjects were still lives or portraits of willing subjects. I numbered each successive painting on the back. Lerner was exhilerated by my rapid progress and assured me that if I kept it up I would become a great painter. I adored Lerner and he became the single person in my life who strongly influenced my views of life and of the world, at a particularly impressionable stage of my development. His every word and thought became gospel to me. He imbued me with the overriding importance of seeking the truth and disregarding superficial appearances, fashions, or authority that might be in conflict with direct observation or reason; with the values of striving for excellence, with the importance of maintaining self-respect at all costs even in the face of hardship or need; with the obligation of every person to leave behind something of value; and with the view of money as merely an aid for achieving these goals. Only much later did I connect Lerner's early training in Kiev as a rabbi with his remarkable view of life, which became the basis for my own. Continuous hard work and skill development was another one of Lerner's tenets which he supported by pointing to his own habit of working daily from sunrise until sunset with pauses for necessities only. I would guess that it was the value system I acquired from Lerner that predisposed me to my later switch to a career in science.

When Lerner left for New York at the end of 1942, my style underwent rapid change and became much freer. Liberated from stroke-by-stroke accountability for meeting technical criteria, I began to strive for total effects of mood and composition, effects that would not be judged until the painting was completed.

upon my arrival in New York in February of 1944, I eagerly showed Lerner the results of my work of the past year. He was thrilled and renewed his urgings that I dedicate my life to art. I was just as thrilled with the paintings that Lerner had produced since I had last seen him. His color schemes had changed from the brightly saturated ones he had used in Havana to more subdued and sophisticated ones. I was dazzled as if a new world had opened up. For as long as I knew Lerner, on the average of one out of every four or five paintings he produced would move me to the point of bringing tears to my eyes. His ideas had the inevitability and simplicity of all great art. I considered Lerner then (and still do today) an artistic genius on a plane with the greatest of the post-impressionists, excluding none. Lerner's best paintings are as important to me still today as any of the world's great masterpieces of music or art. There are four or five of Lerner's paintings that I last saw 35 years ago, that are still as vivid in my memory as if I had seen them yesterday.

In 1945 I began to wean myself from Lerner's influence and to strive for artistic objectives different from those he had set. I still showed him my paintings and sought his critiques regularly, but no longer felt that his critiques were directed at <u>everything</u> I was trying to achieve in my paintings. Around 1947 or 1948, Lerner emigrated to Israel where he wanted to leave his paintings when he died, and about one year after his arrival in Israel he died.

I continued to paint until about 1951. In 1950 I made some major breakthroughs regarding both techniques and objectives. In 1951 particularly, during the last year I painted, I experienced a sharp improvement in my technical command of the oil medium, in the sense of suddenly having the sensation of being able to achieve on canvas whatever was in my mind.

During that last year, my paintings became much more expressive, and reflected unified conceptions rather than piecemeal effects. In retrospect, I ~~fxx~~ feel that I painted only about 14 or 15 decent paintings that I am proud of, and all of these during the last 18 months. I still can't fully explain why I stopped painting at that time and never painted again. But I never did stop painting in my mind. Whenever I look at anything, I subconsciously judge or analyze its color in relation to other colrs in the environment, and every scene I see receives a fleeting critique as to its compositional qualities and an analysis of how it would have to be changed to make a satisfactory composition for a painting. I still do this a hundred times each day, while engaged in other activities. Someday I may paint again.

Music

My introduction to music was at bedtimes when my grandmother or father would sing me to sleep, usually with folk songs . Soon our victrola took over and I listened hundreds of times to arias from Rigoletto, Il Trovatore, and Magic Flute. At seven I took piano lessons for a short time but this was a failure, as I never wanted to practice.

My three-year sojourn in France from age seven to ten represents a near-total gap in my musical development. But I made up for it when I got to Havana. Shortly after my arrival father bought an upright piano and the music for Chopin Mazurkas and Beethoven Sonatas, things he had learned. I couldn't get enough of listening to him play his mazurkas and the Moonlight, Pathetique, and numbers 13 in E flat, 20 in G, and 12 in A flat. Every evening I enjoyed a little concert. He would also play certain of the easier Chopin preludes. One of my important musical experiences of that time was a concert to which my father took me, at which Beethoven's ninth symphony and Schubert's ninth symphony were performed. It was the first concert I ever attended and to this day I recall that concert when I hear either of these peices. In general, there was an active musical life in Havana at that time due to the presence of thousands of Viennese and German Jewish refugees with extensive musical educations who had nothing to do but perform for each other while waiting to come to the United States.

I began to spend increasing amounts of time at the piano picking out the pieces I knew, and trying to write them down. Father bought John Thompson's beginner's books, and I quickly worked my way through them learning each successive piece. Toward the end of 1943 father got me a piano teacher who taught me Für Elise and Mozart's Sonata in C, along with scales. When I arrived in New York, I immediately began to study with Prof. Leon

Erdstein, a cousin of ours by marriage who had been a well-known composer, pianist, and teacher in Europe before the war. I went to his studio at Steinway Hall on 57th Street every Saturday morning for the next four years, and practiced three hours per day, quite regularly. At first we did not have a piano and I had to go to the Ethical Culture Society's premises where there was a Steinway upright that I was allowed to use from seven to ten every evening. In 1945 father surprised me one day when I found a Bramback baby grand in our living room.

During the entire period from 1944 when I arrived in New York until I graduated from college in 1952, I listened to every piece of music I could on the radio. I had the WNYC and WQXR program guides which I marked at the beginning of each month as to the programs I would try to catch. To a great extent, I built my life around the programming of these two stations. As a result, I developed an enormous familiarity with the classical music literature.

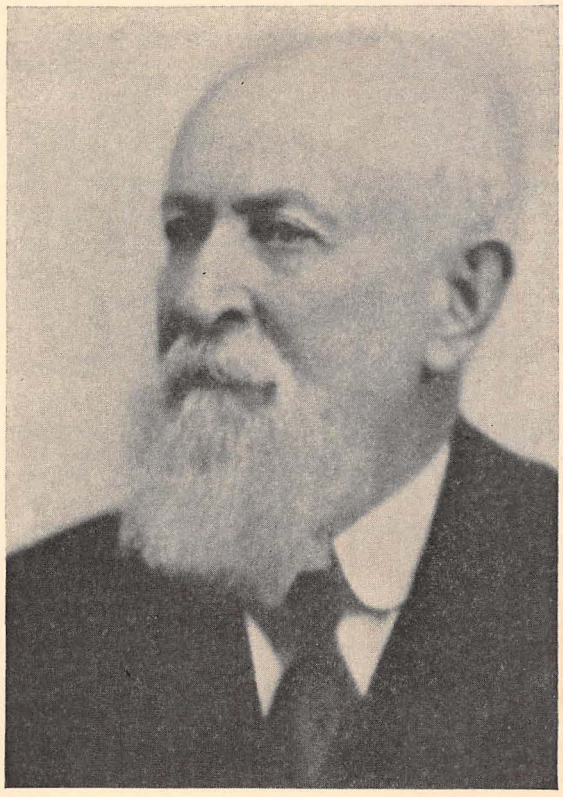
Prof. Erdstein felt that I had a great talent for music and the potential to become a professional pianist. He told me many times that he had rarely seen such rapid progress in a student. My goal was to be able to play certain specific pieces that I had heard either in movies like "Song to Remember" which was the Chopin story, or on the radio, but concertizing never excited me as a wothwhile endeavor. Of course, I derived enormous social approval and admiration from age-peers and adults alike my performances for friends or social gatherings. For a long time, performing at the piano was my only significant social skill. But I never felt that my musical talent was in the same category as my talent for art, where I never had any doubt regarding my ability to achieve any goal I

might set for myself. I believe that I was objective when I decided that my talent for music and the piano, though substantial, was not of such a level as to justify the dedication of a significant portion of my life to music. So I stopped taking lessons around 1949 and practiced only sporadically to polish some of the pieces I had already learned such as Beethoven's Appassionata and Chopin's Ballade #1 in G ~~mixm~~ minor. During that period I tended to lean toward the more romantic and passionate pieces, and those are the ones that dominate my repertoire to this day.

From 1945 until the mid 1950's, I gave piano lessons to make money. I had in the range of 2 to 4 students at any given time. My teaching method was generally modeled after the only one I knew, namely Erdstein's, but after 1952 I began to enrich it with some of the learning theory principles that I was assimilating through my psychology studies at Columbia.

In the summer of 1952, I bought myself the dream of my life, a Steinway baby grand with a beautiful bass, with the first money I earned as a research assistant at Columbia University. At thattime I was already living with Donald A. Cook who also happened to be my boss on the research project at that time. I continued to play for friends or pleasure from time to time over the next 25 years, but because I did not practice systematically, my technique deteriorated. In 1966 Vicki and I bought a second piano for the house in Usonia, this time a Steinway concert grand. This acquisition inspired me to practice for a few weeks and to put some of my repertory pieces back into shape for an informal musical evening for friends.

But the big comeback occurred in 1977. Rona Senior, a friend of ours and singer, asked me to perform the Appassionata and some other peices at a



Prof. LEON ERDSTEIN

Composer and Music Pedagogue

CRITICISMS ON THE COMPOSITIONS OF LEON ERDSTEIN

Neues Wiener Tagblatt, Vienna . . . "Erdstein—a distinguished musician, avoiding each of the customary effects and every mannerism—a composer whose profound and lyrical sense of poetry shows an extraordinary delicacy, reminding one of the tender colors of an aquarelle, in both his piano pieces and his songs, in which he expresses in a captivating manner more the fugitive charm of the soul melting with the words than an independent melodic form completed in itself . . . "

musical evening at her house, and at about the same time, Michael Podlon, the Director of the Westchester Conservatory of Music heard me fool around on the piano at a neighbor's house and suggested that I prepare and give a recital at the Conservatory sometime in 1977. I accepted. The Rona Senior musicale provided me with a dry run. For a period of about five months, from about May to October of 1977, I practiced daily to put the program together. Toward the end I put in regular 6 to 8-hour days at the piano, and my technique was soon back to its former level. In fact, I think I exceeded by former skill in musical terms, but still fell far short of achieving the effects I strove for.

Perhaps the most important benefit of the 1977 exercise was the discoveries I made regarding the behavioral principles for building ultra-stable stress-resistant performance. The principles involved are applicable not only to pianistic performance but to any type of repetitive performance of prescribed behavior. I began to write a book on this subject.

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WESTCHESTER CONSERVATORY OF MUSIC
30 BURLING AVENUE WHITE PLAINS, NEW YORK 10605 RO 1-3715

PIANO RECITAL

Francis Mechner, pianist

Friday, October 21, 1977

8:30 P.M.

PROGRAM

Impromptu E^b major Op. 90	Schubert
Sonata in F minor "Appassionata" Op. 57 Allegro assai Andante con moto Allegro ma non troppo Presto	Beethoven

INTERMISSION

Scherzo E^b minor Op. 4	Brahms
Mazurka B minor	Chopin
Fantaisie-Impromptu $C^{\#}$ minor	
Etude F Major	
Etude C minor "Revolutionary"	
Nocturne in $C^{\#}$ minor Op. (Posthumous)	
Ballade # 1 G minor	
Valse in E minor	Chopin
Prelude No. 24 in D minor	Chopin

Gebet eines älteren Menschen

Der frühere New Yorker Gouverneur E. Dewey hat das nachfolgende Gebet, das zuerst im März 1959 in "The Readers Digest" erschien, vielen seiner Freunde zugesandt und zitiert es auch häufig.

Allmächtiger, Du weisst es besser als ich, dass ich älter werde und eines Tages alt sein werde.

Behüte mich davor, dass ich schwatzhaft werde, und insbesondere vor der schlechten Gewohnheit, zu denken, dass ich über alles und bei jeder Gelegenheit reden muss.

Befreie mich von dem Streben, die Angelegenheiten anderer Leute schlichten zu wollen.

Lasse mich nicht endlos Details rezitieren — sondern gib mir Flügel, damit ich schnell zur Sache komme.

Ich bitte Dich, mich bereit sein zu lassen, den Geschichten anderer Leute über ihre Leiden zuzuhören. Hilf mir sie mit Geduld zu ertragen.

Aber lass nicht Klagen über meine eigenen Schmerzen und Sorgen über meine Lippen kommen — sie wachsen ständig, und meine Lust, sie zu erzählen, wird jedes Jahr immer stärker.

Lehre mich die glorreiche Lektion, dass es gelegentlich möglich ist, dass ich unrecht haben könnte.

Lass mich einigermassen liebenswürdig sein. Ich will kein Heiliger sein — mit manchen Heiligen kann man so schwer zusammenleben — aber ein verbitterter alter Mensch ist eines der Werke des Teufels.

Mach mich nachdenklich, aber nicht brütend, hilfreich, aber nicht herrschsüchtig. Es ist schade, dass ich meinen aufgespeicherten Reichtum an Erkenntnissen und Weisheit nicht voll ausnutzen kann — aber Du weisst, Allmächtiger, dass ich wenigstens ein paar Freunde mir erhalten möchte.

Amen.

Jones den Rabbinern in einem | des Elend und Verfolgungen er-

Chess

I was taught the moves in 1945 by a friend whom I was able to beat in the first game I ever played and in every game he and I played thereafter. The game fascinated me, and I played with mother almost daily for several weeks until she could no longer beat me. Then I went through the same process with my father though that took some months. At Erasmus Hall High School in 1946 I met Joe Sucher who was a brilliant up-and-coming chess expert and who quickly became my best friend. Joe for reasons of his own decided to give up chess at about that time, but this did not prevent him and me from bartering piano lessons, which he eagerly desired, for chess instruction for I was equally eager. Joe would play me blindfolded while playing the piano for my critique. During my high school years my chess playing was limited to informal skittles games with the other players in the Erasmus Chess Club, and becoming the best player at Erasmus (other than Joe Sucher) did not take me long and was no great achievement.

In the summer of 1948, prior to entering Columbia College, I set out to improve my game to the point where I would make the Columbia Chess team which was very strong , with Walter Shipman at the head of it. I systematically went through Capablanca's 100 Best Games by Golombek, memorizing every game and every analysis variation. By the end of the summer, I felt that if I wasn't quite as good as Capablanca yet, I had to be close, I wasn't sure, as I hadn't played a single game all summer, (I was in the Catskills where there were no opponents) but didn't I know and understand Capablanca's best games? It was somewhat unsettling to me to be soundly trounced by the top players on the Columbia Chess team in the Fall when I tried out for the team. But I went to the Columbia Chess

Francis giving chess instruction to a motivated student. Summer of 1951

Club every day and it was not long before I was beating everyone except for Shipman. In the Fall of 1949, Eliot Hearst and Jimmy Sherwin entered Columbia. They were already then known as chess prodigies and later became among the top players in the United States. Carl Burger and several other talented players entered Columbia at that time, and I became number 3 on the team behind Hearst and Sherwin.

In December of 1949 a U.S. College Chess Championship was held in Philadelphia. The entire Columbia Chess contingent entered, as did other players from all over the country. Eilot Hearst came in second, I came in third, and Jimmy Sherwin fourth. All of us were classified as masters as a result of that tournament and I received a USCF rating of 2236. This was a remarkable result in that this was my first tournament. It is possible that no player has ever achieved this level of result with as little tournament or other chess experience as I had at that time.

I continued to play and to improve during the next two years. During 1950 and 1951 I spent a great deal of effort on an international postal chess tournament. I played in the name of Carl Burger whose father had forced him to abstain from chess until his grades recovered. Among the players in the correspondence tournament were several former U.S. Champions, the World Correspondence Champion, and several other well known players, 21 in all. I won the tournament with no losses and only two draws, and Carl Burger became famous.

My great asset in chess was my analytical ability. I am able to analyze a position with great patience and concentration while taking nothing for granted. My preoccupation with underlying principles, which in chess expressed itself as the cultivation of positional judgment and the

determination of strategic principles applicable in various types of positions, compensated in part for my relative lack of tactical and practical playing experience. By the time I stopped playing chess in 1954, I had played a total of about 50 "serious" (clock) games, which is a small fraction of the number of such games other players of about my strength had played on the average. I was also able to perform certain tricks that are more impressive to non-chessplayers than to chess players, such as playing three games blindfolded simultaneously or remembering each of fifteen or twenty games played in an afternoon of offhand chess. From a chessplayer's point of view, my greatest strength was always, and still is, opening strategy, a phase of the game in which I could usually outplay even the strongest players I encountered.

During the period 1954 to 1978 I played little or no chess, and consequently lost much of my skill. During the 1970's I occasionally played 7-minute chess with Larry Abrams who is an afficcionado of this form (or perversion?) of chess. In July of 1979 I entered a weekend tournament just to see if I could still do it. I came out with an even score, but witnessed in myself the universal phenomenon among chess players, of age taking its toll. After the age of 40, chess players gradually begin to lose the stamina that is needed to maintain for the required 4-5 hours the high level of energy expenditure and alertness that the average tournament game demands. However, I became interested in analyzing the behavioral components of chess skill. It seemed to me that there are three components of chess skill that can be separately developed: (1) Knowledge of concepts in the sense of recognizing and properly classifying positions in terms of the tactical or strategic approach they require; (2) Calculation skill in the sense of ability to visualize future positions accurately when "thinking ahead" and

to keep track of the variations and sub-variations; and (3) Scanning skill in the sense of noticing all significant relationships among pieces in any given position, including obvious relationships that can be overlooked when scanning is careless. I then proceeded to try to develop appropriate exercises for each of these three skill components. To develop skill (1), I hypothesized that the most effective type of exercise would be a systematic periodic review of all games played so that they would never be forgotten. This could be accomplished by replaying each game played, at geometrically increasing time intervals. Only if they are remembered can the thousands of positions encountered become grouped into concepts based on common features. Otherwise, they remain isolated experiences with little cumulative learning occurring. I decided to be my own Guinea pig for researching the effectiveness and feasibility of the review procedure for concept formation. For the next year (September 1979 to July 1980) I played a total of about 60 clock games and reviewed each one at geometrically increasing time intervals. The result was that I went from an initial performance rating of about 2,100 to a performance rating of close to 2,400 for the last 13 games I played during that period. My final USCF rating was 2185 and my final FIDE (international) rating was 2,220. So, the procedure seems to have worked quite well for me. But in analyzing my performance it also became evident to me that my main deficits were in the skill categories (2) and (3), especially (3) which can only be improved by intensive playing practice.

To me, the significance of the chess skill study is the potential applicability of the result to areas other than chess. It seems likely to me that there are many skills such as conversation, sports, argumentation, combat, or vehicle operation that can profitably be analyzed and developed in terms of the same three-factor model I applied to chess.

Collecting Butterflies

This hobby of mine began in Vienna, at a very early age, when my father used to take me on Sunday outings to the mountains and suburbs that surrounded Vienna. We would take along our nets and other equipment, and then mount our catch of the day on mounting boards when we got home in the evening. Father himself had been collecting butterflies since he was ten, and had accumulated a beautiful collection over the years, which I enjoyed looking at in the display case in his waiting room. During the summers, we normally went to the country where father would visit us on weekends. At those times he and I would go on butterfly catching expeditions to which I looked forward all week. But my interest in butterflies was not confined to the summers. I was always drawing the butterflies in full detail, and memorizing their markings and shapes from the many butterfly books I had. I knew every central European butterfly by name and could draw it from the front and back. I know them to this day.

When I went to France, I immediately began to collect butterflies wherever I found any -- first on the Plateau D'Avron near Paris and then in Paris-Plage in Normandie. But during the combat phase of the war I lost my collection and equipment and therefore did not resume collecting until I came to Cuba. The new and very numerous tropical species I found there, many of which I knew from my childhood books, stimulated me to a new level of enthusiasm for collecting. Again, father and I went on occasional outings to collect the exotic tropical species, such as Uranids, that could be found only in certain outskirts of Havana.

After my arrival in the U.S., I collected butterflies only rarely and sporadically, and finally lost interest in this hobby almost completely.

It was revived unexpectedly in October of 1965 by Vicki. I had to go to Bangkok, Thailand for three weeks in connection with my UNESCO educational consulting work. In packing my bag, Vicki secretly included a butterfly net she had bought me and some pins and mounting boards. I was overwhelmed and delighted when I found these things as I unpacked my bags in Bangkok. It so happened that the Chulalongkorn University at which I worked in Bangkok had a large bejungled tropical garden as a campus, complete with lake and flower bushes. Butterflies abounded and I went catching almost every day. On one of the weekends, I went to the seashore with a friend and caught still different species there. I also introduced myself to the people at the university's zoology department where they had a butterfly collection of local species. When I saw the sad condition of that collection, I offered to play curator for a week by remounting and organizing the collection, a chore on which I spent five or six of my evenings in Bangkok, and from which I derived enormous enjoyment. Due to my early childhood training, there are few activities I enjoy more than mounting butterflies in solitude during an evening. Each butterfly is a separate challenge depending on its structure, size, shape, blemishes, and degree of dryness. The work of mounting butterflies requires great meticulousness, patience, manual dexterity, knowledge, and most of all compulsiveness. For me, it takes my mind off everything else in life, as does the activity of catching. During those evenings at Chulalongkorn university, I savored the sensation of regaining my former skills in butterfly mounting.

In January of 1966, Vicki, Jordan and I went on a vacation trip to Venezuela and Brazil. After several days in Caracas on which I did a lot of catching behind the hotel (including my first morphos), we went to Rio

de Janeiro and then to Sao Paulo. There, Dora Fix took us by car to the island of Guaruja, a resort island of the coast of Sao Paulo where the Fix's had a seashore luxury apartment. I went off by myself every day with my net and equipment while Vicki, Dora, and Jordan went to the beach. As usual, I spent the evenings mounting what I had caught during the day. Then Vicki, Jordan, and I went back to Rio for a few days, where I caught many fine specimens in the Floresta da Tijuca around Rio. This whole trip was very exciting for me as it enabled me to catch, for the first time in my life, and also to see in the wild, many of the species that I had always regarded as exotic beauties to be admired in the pages of butterfly books and in museum cases, but never to be seen or much less caught by me.

From that time on, Vicki and I began to take our vacations in the tropics, orienting them around butterfly catching expeditions. We went to Nicaragua, Mexico, Venezuela, Peru, Trinidad, Jamaica, and other Carribean islands, each time bringing back enough butterflies to fill one or two large cases. Two of the most exciting collecting trips I took with father. In the Fall of 1970 we went to Guyana, deep into the jungles where the morpho Menelaus can be caught. Father and I both kept a detailed diary and chronicle of that trip. The following March, 1971, father and I took another trip, this time into the Amazonian jungle area of Ecuador. That trip too was quite an adventure and is described in great detail in our trip diaries and movies.

I stepped up my collecting activities in 1973 when I began to take frequent trips to Brazil. I often stayed at the house of my friends the Fix's in Sao Paulo. Their house was in the Morumbi section, near the Morumbi park which was at that time still relatively wild. On weekends and occasional weekday mornings I went catching in Morumbi park, and occasionally on weekends I went to the seashore to stay in their Guaruja apartment to go catching in more

isolated jungle areas. Once or twice I took Vicki to Brazil with me and to Guaruja, on one occasion with Linda. Once Vicki and I went to Iguaçu Falls, at the intersection of Brazil, Argentina, and Paraguay where butterflies abound because of the presence of one of the world's largest water falls. My last major butterfly catching expedition was in 1976 to Iguaçu, for five days, on which I caught a total of 750 butterflies! Altogether I accumulated a collection of about 4,000 butterflies over the course of the past fifteen years which are displayed in about 40 display cases that hang on our walls in Chappaqua and the apartment in New York.

My attitude toward butterfly collecting is to view it as more of a sport than as a scientific endeavor. As one would expect, I have developed a great knolwedge of the ecological, climatic, and botanical variables that influence butterfly prevalence. In practice, this means that I am pretty good at predicting what butterfly species will be flying in a given spot, on the basis of the vegetation, weather conditions, time of day and year, temperature, etc. But I have never been tempted to codify this knolwedge into systematic generalizations that might have scientific interest. The only thing I have done in the area of butterfly collecting that is related to science is that I have organized my display cases to reflect "what flew where, when". Each case contains the butterfly species that were caught in a given locale within a period of several days. This could be of interest to anyone wishing to study butterfly population distribution shifts in these locations over extended periods of time. However, I don't consider this type of study very important or worthwhile in view of the widespread and self-evident destruction of fauna habitats. So, to me, butterfly collecting is primarily a sport which I enjoy because it uses skills that I have cultivated since childhood, provides wonderful exercise, fosters contact with the outdoors, and creates beauty that can be displayed on walls.

EDUTEC

In May of 1973, UEC's last contract, the one with Nebraska ended and with it the salary I had been receiving from UEC. So I had to find another source of income. I went to my old client Pfizer and offered to develop for them a programmed instruction course that utilized a new and superior version of programmed instruction that I had developed. It was a technique that I had developed at Basic Systems in 1962 but that Basic Systems had never adopted. The essence of the technique is to force the student to obtain his confirmation of his answers and his feedback by looking back through the program, rather than by imply presenting him with the correct answer after the question. I believed that the possible residual uncertainty regarding the correctness of his answer that this method would occasionally produce would be beneficial to learning and motivation. Pfizer game me the contract (which was actually sold by my former Basic Systems associate Charles D. Atkinson) and I developed a programmed course to be used by Pfizer as a promotion to pharmacists on the topic of biological availability -- the absorption of pharmaceutical preparations through the digestive tract.

In the summer of 1973 I received an invitation to address an international congress of educational technology (CONTECE II) in Sao Paulo, Brazil, at which over 3,000 people from all over the world would be in attendance. I received the invitation through former students of mine in Brazil whom I had trained in educational technology in 1963-64 when I was a UNESCO consultant on educational technology. I organized the technical aspect of the project designed to increase the quality of secondary school science teaching in Latin America. I organized a group of about 30 participants from 15 countries into a project team, and they spent one year creating a course

on the Physics of Light using programmed instruction, laboratory kits, and film. Albert V. Baez was the man from UNESCO who hired me for that job, which kept me in Brazil for one month in 1963 and two more weeks in 1964.

So, I accepted the 1973 invitation to give the speech. I was eager to see my old friends again and welcomed an opportunity to "go public" with my new programmed instruction technique. My talk was extremely well received and during the week that I spent in Sao Paulo I was besieged with invitations from old and new acquaintances. One man in particular, Guilherme Dutra da Fonseca, who was th e Executive Director of a governmental agency called CENAFOR, whose mission was to develop the country's training resources and manpower, asked me to give a series of seminars to his organization on educational technology. I declined, saying that educational technology could not effectively be transferred by means of seminars or courses. When he persisted, I agreed that I would make a series of trips to Brazil for the purpose of transferring my technology to his organization if he agreed to do it my way. As in my old UNESCO project, I proposed that he select a group of 20 to 25 capable people whom I would organize into a production team. Their task would be to develop a real, usable course on some topic that had practical relevance, and I would train them, function as their consultant, and help them with the problems they encountered. Dutra was not only charming and brilliant, but also insightful and he saw the merit and logic of my proposal, unconventional as it was. So, we wrote up and agreed upon a contract that was to be confirmed by him by phone in five days. He viewed himself, and probably was, one of the leaders of Brazil's movement to upgrade its technical manpower resources using modern technology to do so. He also remembered my Basic Systems work from the 1960's and realized that I could help him achieves his objectives at CENAFOR.

and had known about Basic Systems and convinced me that I could perhaps just give a series of seminars over a period of may-be 5 months, coming down once a month. I said "No, that would not work, that you cannnot transfer this technology by courses or seminars, but that I would do something else. If he would organize a work force of about a dozen or 20 people, I would organize that group of people into a work force that would develop a training system, a real practical useful training system, with specific application." He agreed and I said that I would write a manual, a set of instructions for these people and would come down once a month to guide them in their work and to look at the results and essentially train them to do this on an operational, practical basis. So, he organized a group of 16 people, young people mostly, and he gave us the assignment of a developing a training system for operators of water treatment stations. I came ~~out~~ down about once a month, which was a very well compensated kind of work, well by their standards. I received 6000 dollars a month and all my expenses were paid, of course. I was extremely well treated. ~~I was~~ While down there, ~~and~~ I re-established my acquaintance and relationship with the Fix family, with whom Vicki and I had been very friendly in the past. Their daughter Dora had been a good friend of ours when she had been working for her Ph.D. at Columbia, some years before. During that time Guillermo Dutra introduced me to other people in Brazil, presidents of companies and directors of organizations and one of them was Giavina, the president of Comgás, the Gas Company of São Paolo, who wanted a large sale training system for gas company service men and gas company engineers, pipeline installers, and another one José Luis Juncueira, who was the director of the Center for Information Technology of the Institute of Technological Research of the

University of San Paolo. And he was interested in the STACKS project, which I had not yet spoken about. Stacks is essentially a new kind of information storage and retrieval system, computerized system, which I have developed in 1964 and 1965 and was one of the proposals, which I had made to Xerox in 1965, prior to leaving Xerox, one of those to which Xerox did not respond. Subsequently, I decided to fund the development of the Stacks System myself and invested in it some 5 or 600,000 dollars of my money and that of Seed Capital Associates. The development work was done by SRC under the leadership of Gene Leonard, who developed a working prototype and a model and did most of the systems work on it and we were ready to implement Stacks in a practical working installation. Junqueira, who had been researching the information technology and information retrieval field for the past year and knew the field very well, became enormously excited by the Stacks concept, which he recognized as the most advanced concept in the field at that time, and still today, as a matter of fact. So, he resolved to research the field further, to find out, whether there was anything like Stacks anywhere in the world. He sent his people on some international trips to the United States and France and determined that Stacks was the most advanced kind of system in the information storage retrieval field. So, he entered into a contract with me to develop the Stacks system for implementation and secured funds to develop two prototypes, which were to be built by Gene Leonard here in the United States and then shipped to Brazil, and the initial nucleus of the system to be installed at the IPT, which stands for Institute for Technological Research, a rather large institute with about 3000 people working there. The application, which we had in mind was to handle allof the files and documents of the institute, proposals, catalo-

gues, correspondence, ingoing and outgoing documents, personal files, etc. and that this system would serve as a showcase and model for the rest of Brazil, which is what the IPT was supposed to do. I was very excited by this project, because it was the first time that Stacks would be implemented on a working basis, on a practical basis at someone else's cost,, not ~~of~~ at mine or my investors' cost. So, this work proceeded very well. Gene Leonard and I came periodically to Brazil to the IPT. We worked with their staff. They put on 20 engineers to work and these engineers worked on the Stacks project for one or two years. I organized a Brazilian firm, which I called EDUTEC. Initially I gave Henry Fix a 5% interest in EDUTEC, because he was extremely helpful to me in organizing the company with advice and all kinds of other guidance. Later, in early 1975 - the contracts actually were signed in November of 1974 - both the IPT contract and the Comgas contract by coincidence were signed on the same day, on November 13th, 1974. I hired some staff members to work on these contracts and in early 1975, I made an offer to the vicedirector of Cenafor, a brilliant physicist and educational technologist whom I had gotten to know there, Oscar Ferreira. Oscar left Cenafor and joined me in May of 1975 and has been the president and managing director of EDUTEC ever since. He is excellent, a very good manager, very much liked by employees and customers and extremely honest, and a brilliant, very hard working individual. We made additional marketing efforts. I continued to spend a lot of time on upgrading and further developing the technology that I had started developing in October 1973 and in fact made some very important progress in that area. We got more contracts and the next one, the second contract was with VASP, which is a domestic Brazilian airline, whose president is the former president of Comgas. So, we made two contracts with

Vasp, one to develop a training system for ticketing agents, how to make out tickets and calculate the rates and routes, and another contract to analyze the performance and skills of their personal, and act with the public. Our analysts flew around on Vasp airplanes as if they were ordinary passengers, making detailed records of all their interactions with Vasp personal. We developed ways of analysing these data in a way that they could be interpreted and remedial actions taken where necessary in terms of developing the training systems and diagnosing the sources of difficulties where there were any. And that led to a new proposal, which was accepted and signed by Vasp to develop a large scale training system for supervisors. It turned out, based on our research, that the main weakness in Vasp operations are the performance of their supervisors, even more than the performance of their lower level people. And that project is stillin progress. Early in the middle of 1974, I met Luis Carlos Lobo, who was a director, a very well known M.D., who is a director of NUTES, which stands for nucleus of educational technology and health, a division of the federal University of Rio de Janeiro. His center is one of the leading Brazilian centers of educational technology and health, in fact undoubtedly the leading center, which is internationally known. Since he is very sophisticated in matters of education and educational technology, he engaged me to transfer my technology to his department. It was a 1½ year contract, not for a very large amount of money, it was 30 or 40,000 dollars, but under that contract all of my trips back and forth between Brazil and the U.S.A. were paid, and the project itself was rather exciting to me, because it represented an opportunity to transfer my methodology to one more Brazilian center, from which it could diffuse to the rest of Brazil, since transfer of technology was one of my objec-

tives. When that contract ended in mid 1976, we extended it for another year and a half, again on the same terms and that one is still in progress, in fact about to terminate and the work done under that contract concluded very successfully. The purpose of that contract was to develop two large scale training systems, on for professors of administration, who were really business men, who teach administration in Brazilian Universities on a part-time basis, and the other one a large scale training systems for directors of health service centers, who are doctors, who are the administrators or directors of thousands of health service centers, scattered throughout the interior of Brazil in small towns and villages, to teach these M.D.s how to be effective administrators, and how to run a community-based health service center. Both of these projects are now completed and were developed by a team of about 8 people. A recent test which was conducted on these systems proved extremely successful. EDUTEC then obtained a contract in mid 1976 with a corporation called DATAPREV, which is a large corporation with about 5000 employees, who do all the data processing for the Brazilian Social Security system, and for several other government agencies. They are a date-processing organization. It was a rather interesting contract, because they were installing mini-computers to process data throughout Brazil. They were installing, I think, some several hundred terminals throughout Brazil, and did not have trained operators yet. There were really no solutions to their problems, except to hire us, to develop such a training system. So, in 6 months we developed a training system for their mini-computers operators. This was extremely successful, the training time was cut from, what had previously been two months, to 16 hours on the average. The average error rate, which they had previously experienced, was 5% of forms, of forms contained errors, and the new average, after our training

system was used, was one half of one percent of forms. The trainees, instead of being computer technicians and experienced people, were ordinary typists, so that the salary was reduced by about one half of what it used to be. Our training system permitted them to train about 1000 or 2000 people in a one month period, at the end of 1976, in time for the inauguration of their new system, and they were, of course, extremely happy with that system and immediately contracted with us for additional work, and we entered into several new contracts, which are still in effect. Later, in 1977, they offered our services to the Social Security System of Brazil, who was their main client and is, by the way, the largest organization in Brazil. It is the second largest after the State of San Paolo, with about 130,000 employees. Datapres offerd to develop training systems for all of their personal, based on EDUTEC capability and my help. I made an analysis of the needs of the Social Security System. I wrote the proposal, and they submitted these as a proposal from them, with EDUTEC as a sub-contractor. It was accepted and signed, and then it was changed, so that EDUTEC's role instead of developing the training system was merely to manage the project. The work was to be done by the employees of DATAPREV. So EDUTEC is managing the contract, an 18 million Cruzeiro contract, which correspond today to about to 1.2 to 1.3 million dollars with no costs. The only cost we have at this time is the time of Oscar Ferreira and mine. The precise amount of time we have to dedicate was not specified. It is only the result for which we are responsible. We also entered into a contract last fall with a finance company, named LETRA, which sells savings plans and financial services to companies and private individuals, like a savings and loan company, and we are developing a training system to train their branch personel to sell more effec-

tively and deal more effectively with the public to explain the varioua plans, to persuade customers to put their money in and maintain the good will of the organization. That training system is right now being finished and is about to be installed. That was a contract for approximately 50 to 60,000 dollars, And last month, we had a very major success, we signed two very important contracts with the Itau Bank, the third largest bank in Brazil, and one of Brazil's most prestigious organizations, with branches troughout Brazil and tens of thousands of employees in thousands of branches. One contract involves the application of the same methodology that we used with Vasp, which is to analyze the interactions with their employees and the public. Our analysts will pose as customers so as to analyze in detail and study the kinds of episodes that occur, when the public interacts with their personnel.

Coming back to EDUTEC and the Stacks system, that project got into trouble later on, when the IPT status was changed from a state agency to a private corporation and its funding was seriously curtailed. They were no longer able to provide the funding necessary for the project and even though it was paid, they were not able to maintain the momentum of the project to carry it through to completion and today it is in a quiescent state. It is waiting for new sources of funds, which I am in the process of trying to arrange in cooperation with Junqueira.

I will now say a few words about my family. Vicki and I were married on December 24th 1961. Initially we lived at my apartment at 435 Riverside Drive in Manhattan, which is at the corner of 116th Street, and I spent most of my time working at Basic Systems, going to the office a few blocks down the street and coming home in the evening for dinner. Very often Vicki would come to the office to

This painting was done by Francis from a window of the mountain house on top of the Belle-Air ski area between Pinehill and Fleischmanns in the Catskills, where he had to hold the canvas sitting in an airlift chair going up and down

Dec. 24, 1961. Francis' and Vicki's wedding party. L.-r.: Lisa Ginny, Nancy, Vicki, Francis, Hedy, grandfather Weitzberg, Oscar, Mary, Abe, Johanna, Laura, and Paul.

10/8/61

12/24/61

12/24/61

12/31/61

Dec. '63?

L.-r.: Oscar, Hedy, Mary, Aviva, Nancy, Francis, Vicki, Ginny, Front: Laura, Marianne and Selly Winkler, and Lisa.

meet me for dinner, and we would go out to eat in a restaurant, sometimes at home, and then I would go back to the office in the evening and usually come home at 12 o'clock at night. During that time I also worked most weekends; so we did not have a very active social life. One or two years later, we moved to 380 Riverside Drive, which was at the corner of 110 Street, a much larger apartment, and at that time Basic Systems was at 113th Street and Broadway, so I had a 3 block walk to the office. We continued the pattern, where I would work almost 7 days a week and evenings, and Vicki would see me for meals and for sleeping. We almost never went out and occasionally saw friends, but not on a regular basis. Jordan was born on June 4th, 1964, and that was kind of exciting. At first Jordan had jaundice, which gave us quite a bit of worry. He had very high bilirubin levels for several weeks after he was born, and had to be taken to a hospital and be watched, and couldn't drink Vicki's milk. The pediatrician thought it came from a factor present in Vicki's milk, which we had reasons to doubt, a few years later. At least we were not sure. In any event, I began to spend a little bit more time away from work, with Jordan, and developed various kinds of toys and learning devices for him. During the first year already I taught him shapes, the names of shapes and letters. He was quite interested in pencil and paper. I encouraged that and drew for him, and gave him feedback on his own drawings, which is perhaps part of the reason why he continued his drawing and became increasingly skilled in these kinds of activities. He was always interested in color and shapes, from a very early age on, and in building, in pencils and pens. When Jordan was approximately one year old, I went to Thailand on a UNESCO mission for 3 weeks, which was very interesting for me. It was the first time I was away from Vicki and Jordan for any extended

length of time. 3 weeks at that time seemed quite long. I went to Tokyo, spent two days there, and then to Bangkok, Thailand, where I spent about two weeks, training the Asian scientists on that particular project, which was for the purpose of upgrading the teaching of chemistry in Asian countries. There were two representatives from each of about 15 Asian countries present. Vicki surprised me by packing a butterfly net in my suitcase; in Bangkok I found the butterfly net. And, of course, I was in a place where there were exotic species, which I had never seen before. So, I began to catch butterflies again on thet trip and I came home with quite a few specimens, which I caught and mounted there. I had the background of catching butterflies already, dating back to my childhood. I began already in Austria, and continued in France and in Cuba. But then, I did not catch butterflies for many years in the intervening time. Some time, during that period, Vicki and I became interested in Go. I had become interested in playing Go, before I met Vicki, when I was working at Schering, and many times, when I came home from Schering I would go to Washington Square, and I watched the Go-players and played Go, and I even briefly took lessons from the Japanese master Takao Matsuda, who is the best Go-player in the U.S.A. And Vicki became interested in Go also. We started playing a little bit, and Vicki also began to take lessons from Takao Matsuda. On my way back from Thailand, I again stopped in Tokyo and bought a Go-ban, which is a board on which you play Go, which we still have and Go pieces. Basic Systems developed fairly well; we, of course, had a lot of important customers, including Xerox. After Xerox bought Basic Systems and we had some money, we began to look for a house in Manhattan. Vicki wanted to to move out of Manhattan, because she thought it was too dirty and maybe too dangerous, although at that time it was not nearly as dangerous yet as it became later. But we started looking

for a house, and we looked for about half a year. Every Sunday we went to look at different ~~at different~~ houses and finally, in summer of 1966, through friends, Lorraine and Dan Reznik, psychologists — she worked at Basic Systems — found a house in Usonia, to rent for the summer. We did rent it from Dr. Arthur and Mrs. Gertrude Bier, and during the summer we decided that we would buy the house, as it was for sale. So we bought the house. It was quite beautiful and it was very pleasant to live in the country and to breathe fresh air. Vicki was pregnant during that time with Linda and Linda was born on September 6th, 1966, the fall of the year in which we bought the house. At that point, we began to make arrangements to get live-in help, to help Vicki with the house and with the children, and we recruited Leena through a Finnish employment agency, an "au pair girl", as they were called, Leena Kuivanen. Leena was at that time 20 or 21 years old, and she stayed with us for the next 2½ years, almost became a member of the family. During that period, I spent a lot of time working at home, since I had left Xerox by that time - I left Xerox in July 1966, that same summer - and spent the next 1½ years working on the contract between Behavioral Science Applications and Xerox to develop a verbal skills curriculum and pre-school education curriculum. So, I went into the city several days each week and spent the rest of the time working in Usonia. During that time I also spent a little more time than before catching butterflies in Usonia, since Usonia was in the country and it was a new opportunity to collect specimens that I had never caught before. In the city I stayed in our apartment, which we hadn't given up, at Riverside Drive and 110th Street. About a year and a half after that, Emily was born, that was on January 10th, 1968. During 1967, I again spent a lot of time at home. I spent that

summer on the Media Medica business plan, and I laid the groundwork for its financing, which was accomplished in October of 1967. Once I had begun, I became more involved, since I had to monitor Media Medica and met frequently with Raphael Cohen, and I also began to work more intensively on what later became Universal Education Corporation. At the end of 1967 and beginning of 1968, Xerox decided to abandon the contract and not to go into the business they had planned to go into, leaving the developed product to me. So, everything that had been developed under that contract became my property and I had decided at that time to turn it into Universal Education Corporation. During the summer of 1968, I did market research and developed the business plan for U.E.C. We went on a holiday in March of 1968, to St. Maartens, one of the Caribbean islands, with Leena, Jordan, Linda, and Emily, which was one of the first real holiday vacation trips we went on. Vicki and I had gone on some short vacation trips before that. In 1965, Vicki, Jordan and I took a trip through Paris, Israel, and Vienna. In January 1966, the three of us made a trip to Venezuela and Brazil. At that time I met Sami Cohen in Brazil, and then made an investment in his company. I invested $ 100,000 in a new bank which he had formed at that time, money that I later got back. We spent time with the Fixés and other friends in Brazil. We spent a total of one month in Brazil. I did some butterfly catching down there. We went to Guarujá with Dora Fix, and she and Vicki and Jordan used to go to the beach every day, while I went in the other direction, into the mountains, to catch butterflies. When we went back to Rio, Vicki stayed a lot of the time in the hotel. She was a little bit sick, and I spent several days going to the Floresta da Tijuca, which is a jungle around Rio de Janeiro, where I was able to catch quite a

a few interesting butterflies. One time, that summer of 1965, we went to Europe. We took a 3-week vacation to Israel, where I located Mr. Lerner's paintings. Mr. Lerner had been my painting teacher in Havana, and he and his wife had gone to Israel from New York one or two years before that. Then he died and I wanted to see what had happened to his paintings. His dream had been to get his paintings into a museum in Israel. I specifically went to Mrs. Lerner's house, I tracked her down and I found her in a small apartment with all of the paintings, and not having been successful in getting anybody interested in them. So, I spent about a week or ten days, going from museum to museum, speaking to directors, and eventually I went to Jerusalem to speak to the minister of art and culture, or whatever he was called, and told him the story of Mr. Lerner and showed him the photographs of his paintings and persuaded him to go to Mrs. Lerner's house and see them, which he did, and as a result of that Mr. Lerner's paintings were put into two museums, one in Elath and one in Tel Aviv. I was told later, that these paintings were supposed to rotate, so that they changed back and forth from year to year. I also bought half a dozen paintings from Mrs. Lerner. She would not sell me any more, even though I wanted to buy some others as well. She said she did not need the money, she said she wanted his paintings to stay in Israel, where Mr. Lerner wanted them. She may have been right about that. After Israel, where we met Aviva, during the time that I was running around to the museums and to Jerusalem, Vicki and Jordan were with Aviva at the beach in Tel Aviv. Then I picked them up, and Vicki, Jordan, and I went to Vienna, where we saw the Zimmermanns, and we stayed with them for one night and then stayed in a hotel on the Stephansplatz. On the way back, we passed through Amsterdam, where it turned out that my ~~visa~~ passport had

expired and they did not let me on the airplane. So, I had to stay one extra day to have my ~~visa~~ passport renewed, which permitted me to go and see the Rijksmuseum and the Steetliche Museum, where they have 400 Van Gogh paintings, the other museum the Rembrandt paintings, the Nightwatch and a lot of other Rembrandts. It was a very interesting experience, which I am glad of. Vicki and I were in Paris on our honeymoon in May 1962 where I made my UNESCO contacts. In 1968, I spent much of my time on U.E.C. and used to spend 5 days a week in the city. This pattern continued until 1969. At that point, I had also become involved with Gene Leonard and his company, and Fred Kantor and his company. Between Media Medica, Compat, U.E.C., Fred Kantor and Gene Leonard, I was extremely busy. That was a time when I worked harder than any other time in my life, except for Basic Systems. In the middle of 1969, we moved the business to its present location on 1501 Broadway, where we set up permanent offices for U.E.C. and about the same time I rented the apartment on 200 Central Park South, so that I would not have such a long trip from uptown and Riverside Drive. In 1967, we began thinking about making some changes in our house. At first we thought of building a swimming pool as an add-on in some additional room. Vicki was complaining about the lack of space, and we were in fact very cramped with 3 children and there was a fourth expected at some point. So, after some engineering studies and architectural studies, we concluded that it would not be practical to enlarge the Usonia house, and to add a swimming pool or anything else to it, without very great expense and with probably not very satisfactory results. So, we decided that it would be cheaper that we build a new house. So, we looked for land and found some in 1968. By ~~that time~~ 1969, Leena was gone and Raila had joined us. Raila was a friend of Leena's ~~cousin~~, whom we found in Finland du-

ring September of 1969, to meet Leena's family and to have a holiday, which was very pleasant. There we met Raila and she joined us at the end of 1969. So, we bought the present land in Chappaqua, and engaged an architect to design and build it. Our idea was to build a house around a circular enclosure, which would contain a swimming pool and a tropical garden. The house was completed at the end of 1970, a day before David was born. In fact we put some pressure on the builder to make the house ready, so that we could move in before David was born, because moving while David was an infant, would have been rather difficult. We settled into the house, it was completed, the finishing touches were put on, while we were already living in it, and this was also a time when things were not going too well in business. I had some difficulties with Media Medica at that time but other things were going reasonably well. There were problems with Media Medica, but they had not yet gotten serious, they became serious a little later. I had just gotten the contract with the State of Pennsyvania. U.E.C. had just signed a 4 million dollar contract with Pennsylvania. This was in May of 1970. Early in 1970, Leena, Raila, all the children and Vicki and I went to Peru for a vacation for 10 days or 2 weeks. We stayed in a hotel there in Lima and we planned some side trips to Machupichu and to the Amazon River, to Iquitos. But the doctor then said that Vicki could not go to Machupichu and Cuzco, because the altitude was too great, since she was pregnant with David. So, she couldn't go, I went by myself, caught butterflies, of course, and had a very nice time. While I was gone, Linda got sick. So, Vicki had to take Linda to a local doctor, and the whole trip was not very enjoyable for Vicki.

In late 1970 and early 1971, I went on butterfly catching trips

with my father, the first one to Guyana, in November of 1970 and the second trip to Ecuador, El Puyo, Neto, Tena, which was down the Ambato Road. That was in March 1971. When I came back from that trip, I encountered many serious problems in U.E.C. There was a threat that the contract with Pennsylvania would be cancelled. There were political problems that had arisen, and discovery centers operations were not going particularly well either for various reasons. Lee Brown, the president of Learning Research Associates died of a heart attack on March 31st, 1971. That was the beginning of many vary serious problems for U.E.C. and the next period was very difficult all around. There were financial pressures on U.E.C. and I had to lend very large amounts of money to U.E.C. In 1972, my problems with Fred Kantor began. That was in the summer of 1972, when he suddenly decided that I was his enemy. At the end of 1971, I decided that it was urgent for me to obtain contracts for U.E.C. and at that time we entered into a contract with Alabama and the State of Georgia, and that required me to start travelling. So, I had to travel to Alabama quite a bit and to Georgia, and I was away from home several days a week during that entire next period until 1973. At the end of 1973, I started going to Brazil which was again a new form of travel. This time, I stayed away a week to two weeks at a time.

(Notes and Recollections by Francis)

The Paideia School

When we moved to Usonia in Pleasantville, Vicki and I, apprehensive about kind of school education our children would get, decided to take matters into our own hands and to create a school setting that incorporates sound educational practices. To us, this meant complete individualization of instruction, contingencies that result in the children taking responsibility for their own learning, commitment to objectives rather than to activities, and social enrichment by learning and working together with children of a wide range of ages rather than only with children of the same age. The model we envisaged was the oldfashioned "little red schoolhouse" with some modern twists. We decided to call the school "the Paideia School".

So, we found a location for the school at a local day camp called Breezemont. We hired a headmaster who had an MA in philogophy and he in turn hired an assistant teacher. The main problem turned out to be that of recruiting students. Parents were frightened by the unconventional character of the school and concerned that colleges would not accept the school's graduates. Parents of the older potential students were also concerned that we would not be able to offer the specialized resources such as laboratory facilities, equipment, and specialists for such areas as science teaching, mathematics, and languages. The idea of the Paideia School was to recruit and enlist community resources, help from other institutions, and mainly parents who had special expertise and skills. We did, in fact, get a good bit of parental participation in the instructional activities, but it always remained difficult to get a large number of students. From the third to the fifth years, the number still hovered in the range of 16 to 20 -- not enough to make the school function really well. To make the concept of peer teaching work, with older children sometimes helping younger children, I felt that at least 30 students were needed, ideally fifty.

Jordan, Linda, and for about one year Emily went to Paideia. So did Nancy and Laury Cooper, and some children of friends and neighbors. Those who went benefitted greatly and the parents of Paideia's students and alumni were generally quite enthusiastic. The school was definitely very beneficial for most of the children who went there, mainly because of the individualization, the contract approach, and the low child-to-adult ratio. But I was never satisfied with the total program. There was insufficient attention given to students committing themselves to, as opposed to being assigned, their objectives. I was also never satisfied that students' weak spots were being adequately identified and remedied. And finally, the small number of studnets never allowed us to bring in the resources that would have been needed for a really complete academic program.

I had thought of the school not only as a way to give our own children a better education than was available in the public schools, but also as a demonstration school and model for educational innovation at large. If the school had worked well, I would have tried to turn it into a business for UEC Inc. I felt, and still fell today, that government should support education not by operating schools, but by giving parents education vouchers that they can spend in any of various ways, including tuition payments to innovative private schools like Paideia. I believe that the Paideia concept can be made to work, but that it requires a research and development program that would cost millions of dollars and take many years to bring to fruition.

So, at the end of the summer of 1973, we decided to close Paideia after having operated it for five years. It had been costing me over $20,000 per year and to make matters worse the headmster quite just before the planned opening of the Fall semester. Jordan and Linda were enrolled in the local Grafflin elementary school, which is excellent as public schools go.

PAIDEIA SCHOOL

Director: Francis Mechner, Ph.D.

Principal: John E. Tice, Jr., M.S.Ed.

Address: Breezemont Park, Cox Avenue, Armonk, N.Y. 10504

Telephone: (914) 273-8940

Facilities: A building, suitable for use by young children, and grounds of Breezemont Camp.

Children: Boys and girls, 5 and 6 years of age.

Paideia School is a new school, located in Armonk, Westchester, New York.

It has been organized to achieve the goals of education which are not, currently, being met through traditional approaches. The name, itself, gives a clue to the philosophy behind the school's conception. Paideia is a Greek word which is translated: education of the complete person.

Paideia School strives to prepare children for the world of tomorrow. Principal emphasis is placed on the development of inquiry skills, reasoning skills, problem solving skills, and interpersonal and social skills. Children learn the basic skills usually covered in the traditional curriculum together with our special emphases. The conventional categories of reading, writing, and arithmetic, are treated not as ends in themselves, but as tools for the attainment of the larger objectives. Each child is treated as an individual, in the sense that he follows his individual curriculum at his own pace.

To attain these ends, Paideia School maintains a low pupil to teacher ratio, uses a non-graded team approach to organizational structure, keeps class size down to 8 children. The teachers are highly experienced, innovative, and creative. The school is equipped with the most sophisticated and successful materials that modern educational technology has devised. Such materials include computer terminals, cartridge loaded projectors, electric typewriters, duplicating machines, movie cameras and projectors, tape recorders, still cameras and projectors, overhead and opaque projectors, as well as innovative instructional materials and effective traditional materials usually found in the most advanced schools.

At Paideia School a child takes part in a continuous evaluation of learning progress to permit complete, accurate, and current skill analysis. Learning objectives and goals are determined for each child individually. This individualization permits the formulation of specific methods by means of which each child can attain his objectives more rapidly than he could in traditionally oriented situations. Group instruction is minimized while group participation possibilities are maximized.

Paideia School also arranges visits to neighborhood community facilities to provide general familiarization with the institutions of our culture, and to furnish experiences on which to build an understanding of our society.

The skills necessary for successful functioning in the computerized and technically advanced world of the future, with the explosion of knowledge in every field threatening to engulf the man of today in a flood of information, make necessary the establishment of the most effective learning situations we can devise. Our goal is not simply to enable children to function in the world of tomorrow, but to prepare them to take their places at the frontiers of knowledge in expanding man's horizon. These skills certainly include the traditional 3 R's, but also require the techniques of computer programming, use of modern mass media, and information recording and retrieval procedures.

The school is associated with an educational research group engaged in the development of innovative material for pre-school and elementary school. Some of this material has been developed specifically for individualized learning. The cost of this material runs to over $5,000 per child. Tuition charges are $1,000 per year. Partial and complete scholarships are available.