

THE DIDACTIC CASE: UNDERSTANDING A DISORDERED CHILD WHO APPEARED TO HAVE
CHANGED UNDER SPECIAL MEDICO-PEDAGOGICAL INTERVENTIONS¹

Burton Blatt, Ed.D.

in collaboration with

Ethel D. Blatt, B.S.

Introduction

This paper concerns itself with: (1) a confrontation with a disordered child who presents reasonable evidence confirming substantial change in his behavior; (2) our efforts to utilize the didactic values of this case presentation. Although we do not believe that the paper will contribute substantially to a settling of current controversies abounding on change in children, it may present the case study method -- and its attendant ramifications -- as a way of preparing professional workers more attuned than heretofore to understand and deal with theories of change and to design experiments that study it.

In the Spring of 1962, I received a manuscript from a publisher asking that I read it, reflect on its value to scholars in the field of Mental Retardation and estimate its prospects for commercial publication. This manuscript, prepared by Professor May V. Seago, of the University of California at Los Angeles, was then titled Diary of a Mongoloid and presented -- with commentary by Professor Seago -- the writings of Paul who, through the fortunate circumstances of having an extraordinarily wealthy devoted father

¹We are deeply grateful to a number of individuals whose more than usual professional interest in Jay contributed greatly to whatever claims we may make regarding his development. Further, we are especially indebted to the following colleagues for sharing with us their evaluations and other records, thus making this paper possible: Dr. B. Matzelevich & Mr. J. Ogonik of Fernald State School; Mrs. Walter Bernheimer of the Massachusetts Department of Mental Health Nursery Program for the Mentally Retarded; Dr. Ellen Kang, Miss Ida Burwash, and Mrs. Marjorie Gerdine of the Children's Hospital Medical Center, Phenylketonuria Clinic, Boston; Dr. Norman Cohen, Executive Director of the Greater Framingham Mental Health Center; and Mrs. Carol Staples of the Boston University Psycho-Educational Clinic. We hope our efforts have justified yours in our behalf.

and a dedicated creative teacher, was provided with a stimulating cultural and adventurous life, one which most of us have to live vicariously through books, films, and other abstract synthetic media. The results of this childhood of almost indescribable travel and of masterful teaching and affection toward him, is plainly demonstrated in Paul's own words -- from both the affect they convey and their level of sophistication and erudition. Intrigued by this manuscript as I have rarely been intrigued before by "undiscovered" literature, I applied a readability formula (Spache, 1953) to the first chapter of the actual diary. At the time he was thirteen years of age, Paul's written expressability was, conservatively, on the fourth grade level. As he became older, this ability increased to an unusually high level of competence, one uncommonly, if ever, demonstrated by a mongoloid child. It wasn't only his striking development in orthography that interested me; his conceptualizations were of a high order and his sensitivity and feeling were abundantly evident -- not only in relation to other mongoloid or retarded children, but as compared with unselected age peers.

Along with the technical minutia that reviewers must submit to publishers, I recommended strongly the serious consideration of this manuscript for publication. I felt that this particular book could become a very important contribution, if not a milestone, to our literature on learning and mental retardation. I did raise some caution concerning documentation of the authenticity of the diary. It was not that I questioned the sincerity and integrity of Professor Seago; nor am I apathetic to the notion that a child -- mongoloid or otherwise retarded -- can achieve such capability under certain conditions or interventions. However, in view of the rather sordid, albeit colorful, history surrounding studies and experiments related, in principle, to the one under discussion, a documentation of the authenticity of the diary was suggested in order to interest rigorously demanding colleagues.

In spite of my recommendations, I hope not because of them, this book was left to lie fallow for at least another year until, finally, it was published by Little, Brown and Company in 1964, under the title Yesterday Was Tuesday, All Day and All Night. In the interim between my first contact with this manuscript and its delivery to me as a published book, a file of correspondence was developed, with letters written back and forth to Professor Seago as well as to Professor Samuel Kirk of the University of Illinois and others whom I thought would be interested in this publication. My experiences with the Diary of a Mongoloid (which, incidentally, is the title I prefer), caused me to reflect, almost with morbid preoccupation, on the unwillingness of otherwise open-minded scholars to react more enthusiastically to studies reporting unusual change in individuals, especially toward this specific publication which may well represent the twentieth century counterpart of Itard's Wild Boy of Aveyron (1962). However, its eventual publication and professional reception encouraged us to prepare this paper and to Paul's brilliant teacher, Miss Chipman, and the thousands of other "Miss Chipmans" who never received their just recognition, this paper is dedicated.

It is our purpose here to discuss another child, one we have known -- originally presenting himself with severe learning disorders -- who appeared to have improved intellectually during the course of his involvement in special environments designed to promote change. Unquestionably, our assignment would be far less arduous if it were limited to the problem of whether change did or did not occur. The implication of this paper's title is that it will concern itself with both that question and the infinitely more complex one revolving around those conditions that caused the change. Further, there are at least two factors that add complexity and restriction to the total task: we will be dealing with discrete data from a single individual; at times, we will be forced to rely upon ex-post facto data.

In recent years, an encouraging bibliography has accumulated concerned with the measurement of human change. Unfortunately, these contributions to our technical literature have not noticeably reduced either the number or intensity of what have now become traditional debates and controversies among behavioral scientists. For example, the nature-nurture question has not been satisfactorily resolved, no doubt because it has been so unsatisfactorily studied. The related hypothesis that intelligence is educable -- i.e. it is a function of practice and training -- is as unclear today as it was when Binet presented it early in this Century. Currently, there are raging debates -- both in the scientific and political arenas -- concerned with the utilization of special pedagogies and other interventions to circumvent, ameliorate, reverse, or prevent disordered learning. Lastly, the most sulphurous and destructive of these controversies revolves about the curability or incurability of mental retardation.

It is probable that the continuance of these "scientific controversies" (which are, in and of themselves by the very nature of what science is, gigantic non sequiturs) is made possible by the frivolous attitude some investigators take toward research design and analysis and by their dependence on ostensible change in a single child, or within an insufficiently sampled and controlled group of children, as proof of both the internal and external validity of particular experimental treatments imposed to order change. On the other hand, professional jaundice is so often the case that merely meeting validity requirements is no guarantee that there will be professional receptivity to clear evidence of change, especially in those reports of single individuals (as was evident with Paul, a case certainly accompanied with abundant internal validity).

As was developed so clearly in Harris (1963), especially in those chapters by Holtzman (pp. 199-211) and Campbell (pp. 212-242), there are certain necessary and unalterable requirements for satisfactorily recording change -- these being

mainly concerned with repeated prospective measurements. Further, Campbell (pp. 214-215) discusses several of those factors jeopardizing adequate response to questions on, first, the effects of the experimental treatment in promoting the change (internal validity) and, second, the generalizability of that treatment and population to other populations in other settings (external validity). His summarization of twelve frequently occurring threats to validity, which "...may be regarded as the important classes of frequently plausible rival hypotheses which good research design seeks to rule out.", deserves the attention of all behavioral workers concerned with the examination of reputed change in children (p. 214).

Insofar as the following case presentation is concerned, a rather strong claim is made that the child changed and, further, the change occurred as a result of particular interventions. No categorical suggestion is intended vis-a-vis external validity, i.e. with respect to the generalizability of this case to other children. What will be presented is discussion of Jay with whom we and others have worked in both a global way and in certain very specific domains and from whom we have accumulated rather global repeated evidence that he has changed remarkably. Further, these changes were accompanied by formidable attempts to increment his behavior in positive directions. The degree to which these attempts were causally related to the changes in behavior has been of major interest to our university students and faculty and -- for the purposes of professional preparation -- this kind of study forms the core of our program. As this case study represents molar, rather than molecular, attempts to order and assess change, it leaves one with a great many unanswered questions and unconfirmed speculations. For exactly these reasons, this type of case serves our University clinical education program well. Hence, its designation as a Didactic Case.

Jay

We first met Jay when he was one year old. We had recently moved to Massachusetts from Connecticut and the house we bought was approximately seventy-five yards from Jay's home, separated by pleasant woods and an infrequently traveled street. As a result, it was not surprising that Jay's parents and we became good friends, with their children playing with our children and with frequent opportunities for the adults to observe their daily behavior. To be perfectly candid, our first impressions of Jay were of a beautiful child who was quite chubby and possibly somewhat slow in development. What eventually struck my wife was that, approximately six months after we first observed Jay, other neighbors remarked to her (possibly because of their knowledge of the work I do) that "Jay is not developing well". Apparently, these remarks were not either infrequent or secretive and, for one reason or another, Jay's mother confronted me with the question of whether or not Jay was developing atypically. Out of neighborliness, although sensing the situation as fraught with danger for me, I proceeded to observe Jay with a more critical and professional eye and somewhat more systematically than one ordinarily observes a neighbor's child. My evaluation, which was submitted to the parents as sympathetically and equivocally as I could possibly manage, was that, yes, Jay appeared to be developing slowly (using the Vineland Social Maturity Scale, among other measures, I found him to be moderately subnormal in development). I discussed two recommendations at length with the parents. First, I suggested a visit to the family doctor who, because of Jay's age if nothing more, it was felt should coordinate any program of evaluation and treatment, if necessary, for him. Second, I discussed with the parents the requirements of young children for early stimulating experiences, especially with peers. I had known that Jay's father, a bright and hard working young man, had recently left his position due to a bankruptcy of the firm where he was employed. Naturally, this had been troubling him and

may have caused considerably more tension in the home than heretofore. I also knew that Jay's two older sisters rarely spent time with him, this being a natural and expected situation when considering the years separating Jay and the girls and the other interests of healthy near-adolescent girls. It was also known that the home had few blocks, infant toys, or other play materials. My observations disclosed, and these were confirmed by my wife, that Jay had rare opportunities to play with other children -- either his sisters or peers -- or to engage in ordinary infant explorations. I suggested several things the parents might do to encourage the older sisters to spend more time with Jay, to find opportunities for Jay to be placed in contact with other children, and to bring into the home certain materials calculated to add new dimensions and enrichments to Jay's explorations. I also encouraged the parents to involve themselves more with Jay in a variety of activities that we discussed.

Between the ages of one year-six months to two years-six months, Jay was examined on several occasions by the family doctor. He reported to the parents that Jay's developmental lag was due to his chubbiness; he was evaluated as being a healthy and robust normal infant without any neurological deficits or other physical abnormalities. The parents were advised to wait for the child to develop and not to be unduly anxious about the problem. However, as Jay began to approach his second birthday, the parents became more and more concerned. They had noted some little progress in oral communication and developmental skills -- attributing this to the greater attention they had been giving Jay and the inclusion of new and interesting toy materials into the home. Nevertheless, they were greatly discouraged with his progress and at wits end to effect an improvement. Each time they consulted me about this, I advised them to either seek new medical and psychological advice or confront again the family physician with their fears.

Their problem remained in this rather chronic and in limbo state until one

evening, upon returning home from the University, my wife met me at the door with a rather startling suggestion. Earlier that afternoon the washing machine in Jay's house had broken down and his mother had brought in a bundle of dirty laundry (mainly Jay's diapers) to be washed in our house. Unable to avoid noticing the overpowering odor emanating from the diapers, and mentally retrieving some recent discussions we had had about phenylketonuria (P.K.U.), my wife was able to make an impressive case for immediate neurological-metabolical evaluation. The more we discussed Jay that evening -- remembering the difficult case of eczema he had as an infant and with which he was still somewhat troubled, viewing his delayed developmental growth and current uncoordination in gait in a new light, and thinking differently about his fair complexion and hair coloring -- the more we began to realize that some rather immediate advice was needed.

I placed a call that night to the chief neurologist of a near-by state school for the mentally retarded to arrange for an immediate evaluation. Further, I specifically asked for Jay to be tested for possible phenylketonuria. I did not blame the neurologist for a somewhat condescending attitude toward this latter request. First, I am neither a physician nor expert in the clinical diagnosis of P.K.U.; it may be fair to state that my wife is even less expert, if one can be less of an expert than a "no-expert at all". Second, P.K.U., arising from an inherited enzyme defect blocking conversion of the amino acid phenylalanine to tyrosine, almost invariably causing permanent brain damage and, if untreated, mental retardation, occurs in only one of approximately 12,000 births (Heber, 1959, pp. 26-27). Further, and possibly the greatest irony in a series of ironies associated with this case, at the time that we requested evaluation for Jay, Massachusetts was the only state with mandatory legislation pertaining to the screening of infants for P.K.U. (More recently, Louisiana, New York, and Rhode Island passed such mandatory legislation and, now, Illinois and Oregon have permissive legislation in regard to P.K.U. testing.). To push the irony

a bit further, at the time of our dilemma, there were 114 hospitals in Massachusetts participating in the P.K.U. screening of newborns; the very fine community hospital in our town was one of the participating institutions. Therefore, for all of the above reasons -- especially knowing that Guthrie's inhibition assay method of screening infants prior to hospital discharge, disclosed that in more than 40,000 infants tested in a recent one year period, only 39 cases of P.K.U. were found, which incidentally was a significantly higher incidence than previously reported in the literature -- it was not expected that our fear for Jay would be borne out. Jay was evaluated the next day and a phone message was waiting for me at our clinic. He had P.K.U.

Earlier, I had mentioned that there were other ironies associated with this case. Several weeks before the eventful diagnosis (with this particular condition, extraordinarily crucial weeks), I had suggested to the mother that Jay be given a thorough pediatric evaluation and particular concern be given to metabolic examinations. Knowing about the eczema, I made this suggestion dimly considering P.K.U. as a very outside possibility. Jay was brought to the family physician who reported no disturbance or abnormality. After the P.K.U. diagnosis was made, it was found that this particular family physician had both received literature concerning P.K.U. testing and was associated with the local hospital involved in this state-wide testing program. He pleaded a kind of curious defense to the parents; since Jay was, at the time, two years old, he did not believe it worthwhile to test his "older" patients for this condition. To "flash back" again several weeks before the P.K.U. diagnosis, I remained unsatisfied with the medical attention Jay was receiving, but not wanting to in any way go beyond my perogatives, I sought and received permission from the parents to bring the case before a very prominent neurologist, associated with a major medical school in Boston. Unfortunately, an appointment could not be secured without a delay of many weeks. Hence, the continued uncertainty and unsatisfactory attention

to the diagnosis and treatment of Jay's atypical development.

The diagnosis of P.K.U. elicited a series of treatments, both medical and educational, that prevented this case from becoming more tragic in consequence, not withstanding the fact that Jay was considered rather "old" to be receiving much benefit from a phenylalanine-free diet and knowing that unless P.K.U. is diagnosed very early in infancy it is rare that diet and other therapies prevent permanent and irreversible brain damage and consequent mental retardation (Bruhl, et al., 1964). Possibly, one of the factors contributing to Jay's surprisingly good response to therapy and the relatively minimal permanent damage done prior to the therapeutic regime was the intrusion of another irony coincidental to this case, this one being much more favorable. Since early infancy Jay had been treated by the family physician for his eczema and the diet prescribed was one low in phenylalanine.

The following recounts the presenting problem and the technical descriptions of Jay's subsequent diet therapy. To overview this and the succeeding section, it may suffice for us to say that after a short period of excellent private medical care, the family was admitted to the Boston Children's Hospital Medical Center Phenylketonuria Clinic. Concurrently, I arranged for his admission to a well developed pre-school program for the mentally retarded, sponsored by the Massachusetts Department of Mental Health.

The Presenting Condition and Subsequent Diet Therapy

Jay's P.K.U. condition was initially diagnosed at age two year-eight months. He had presented himself with mild developmental retardation, hyperactivity, and eczema dating back to infancy. His mother reported that he rolled over at nine months, sat alone at one year, walked at 22 months, and had been severely delayed in his speech. The two siblings, both with negative testings for P.K.U., were doing low average work in school. The diagnosis disclosed: a normal general physical condition; grossly normal hearing and vision; normal tone, strength, coordination, and motility in all four extremities; absence of pathological reflexes; and grossly intact cerebellar functioning. However, 3 urine samples conclusively confirmed a diagnosis of "Inborn Metabolic Disorder" (P.K.U.).

At age two years-nine months, Jay was given a psychological evaluation at the Fernald School. The staff psychologist reported that, while waiting for Jay and his parents to appear for the evaluation, he heard some loud commotion outside his office door and, looking up, saw two adults pulling a screaming, yelling child through the door. It was Jay. Upon entrance, the parents released him and he stood in the center of the office, refusing to move. When attempts were made by the parents to push him towards the table, he screamed violently and resisted. After much bribery and cajoling on the part of his parents, Jay reluctantly agreed to sit at the table beside his mother and father. When test materials were placed before him, he would promptly sweep them to the floor with the back of his hand and arm. After a great deal of effort by the psychologist, Jay responded to a few of the test items. On the Stanford-Binet, he passed two items on the year II level, Delayed Responses and the Block Building. If one could assume Basal Year of I-6, which is an unwarranted assumption, at this testing Jay received a Mental Age of I-8 and an I.Q. of 61. On the Vineland Social Maturity Scale, which was based on parents' information, Jay scored exactly as he did on the Stanford-Binet, a Social Age of I-8 and a Social Quotient of 61. On the Peabody Picture Vocabulary Test, Jay rejected the test and refused to respond to any cards.

At age three years-one month, Jay was given a complete initial medical examination at the P.K.U. Clinic, which was approximately five months after the diagnosis of the condition and the beginning of orthodox treatment. At that time, he measured 97.5 cm. long and was 37.5 pounds in weight. His head circumference was 50.2 cm. No clinical abnormalities were noted on examination other than a mild hyperactivity. Blood phenylalanine was 9.3 mgs. % and he was placed on a 350 mg. PA/day diet. Although Jay's blood phenylalanine level was not ideal -- the P.K.U. Clinic believed greatest benefits would be had with levels below 6 mgs. % -- this level did reflect the five months of

treatment Jay had been receiving and was substantially better than levels in the 20's, his reputed level at earlier diagnostic testings. At three years-two months Jay was given an electroencephalogram. An induced sleep and brief waking tracing was obtained. The background frequencies were within normal limits for age. There was shifting asymmetry in mid-temporal and post-temporal leads, with intermittent slowing. There were no seizure discharges or clear focal abnormalities. Medication induced artefact appeared symmetrically bilaterally. Strobe did not activate any abnormalities.

At three years-two months, approximately six months after the initial diagnosis and beginning of therapy, Jay was psychologically evaluated at the P.K.U. Clinic. The parents reported that his hyperactive and destructive behavior had lessened somewhat since treatment was initiated. At the time of this evaluation, he was partially toilet trained. Jay was seen for testing with the mother present. It was reported by the staff psychologist that he was a rather difficult child to examine because of his wish to play with certain test items that he liked, e.g. the car. Further, his easy distractability and restlessness and hyperactive behavior added to less than optimal testing conditions. Nevertheless, it was reported by the staff psychologist that it became possible to gain and redirect his attention for long enough periods of time to obtain a seemingly representative picture of his current level of functioning. His speech was immature for his age and reflected frequent pronunciation errors, making him at times very difficult to understand. He appeared to be developing a clear left-handed preference. On the Stanford-Binet, Jay achieved a Mental Age of two years-three months, and an I.Q. of 71. He passed all subtests at the two year level (Basal Age), passed three of the six subtests at the two and one-half year level (failing: Naming Objects, Repeating Two Digits, and The Three-Hold Formboard Rotated), and he failed all subtests at the three year level. The psychologist reported that there was little evidence from present

test findings to suggest significantly higher capabilities.

Corroborating support for these aforementioned findings was strongly suggested by the results of psychological evaluation of Jay conducted at the Fernald School, approximately two weeks prior to the evaluation at the P.K.U. Clinic. Insofar as the Fernald evaluation was concerned, the mother was also required to be with him throughout the testing, forcibly requiring Jay to participate. After a great deal of time and effort by the psychologist, Jay responded to all of the twelve tests on year II and 2-6 levels of the Stanford-Binet. He passed five of the six tests on year II and two of the test items on year II-6. The five tests he failed were: Word Combination, Identifying Objects By Use, Naming Objects, Picture Vocabulary, and Repeating Two Digits. On the basis of that performance, he achieved a Mental Age of two years-one month and an I.Q. of 68. In addition, the Fernald psychologist administered the Vineland Social Maturity Scale where Jay received a Social Age of two years-six months and a Social Quotient of 81. Lastly, on this testing session he responded to the Peabody Picture Vocabulary Test - in contrast to his first evaluation there in May of 1963 -- but passed only four cards: car, cow, ball, and block.

At age three years-two months, Jay was again medically evaluated at the P.K.U. Clinic. His blood level was 9.4 mgs. %. However, at age three years-four months, his blood level rose to 12.1 mgs. %. At this latter examination, he measured 100.3 cm. long and he weighed 41.5 lbs. He had a head circumference of 51.2 cm. and it was noted that his left occiput appeared somewhat flattened. Neurologically, he appeared grossly normal but he resisted examination considerably and a careful study, consequently, was not possible. The mother reported, at that time, that Jay had continued to improve, citing as evidence his increased vocabulary, some decrease in hyperactivity, and good progress in toilet training -- although he was not completely trained at that time. The Clinic conveyed a

concern with his high blood phenylalanine and re-emphasized to his parents the importance of strict surveillance. They, in turn, expressed renewed willingness to control his diet.

This all out effort to bring Jay's diet under control subsequently bore results and Jay's blood phenylalanine level dropped to 0.5 mg. % on examination at age three years-six months. However, the Clinic felt this level was somewhat too low and the parents were requested that Jay be allowed a full 15 equivalents of solids.

At age three years-eight months, Jay was again seen at the Clinic. At that time, his diet consisted of 15 equivalents of solids plus one cup of lofenalac powder. During this examination, the mother reported striking gains made in recent months. He sang songs, rode a tricycle, somersaulted, and spoke much more comprehensively since beginning nursery school, two months prior to this latest examination. On examination he measured 102.5 cm. long and weighed 38.25 lbs. Neurologically, he appeared unchanged. However, his blood phenylalanine had risen to 11.4 mg. % and the parents were then advised to reduce his solid allowance to 13 equivalents.

His last medical evaluation was at age three years-eleven months. His phenylalanine level was still elevated to 12.1 mgs.%. He measured 104 cm. and weighed 35.5 lbs. Neurologically he appeared unchanged. His latest diet was further reduced to 250 mgs. of phenylalanine (one quarter lofenalac plus nine equivalents).

The Educational Intervention

At age three years-six months, through the cooperation of the Massachusetts Department of Mental Health Nursery Program for the Mentally Retarded, Jay was admitted to the pre-school program conducted at the Walter E. Fernald State School. In addition, he was placed on the waiting list for a

similar pre-school program conducted in the community near his home. At that time, we were in the midst of a pre-school study at the Fernald School. Both for utilization by this research and as a training center for teachers preparing to work with disordered children, we developed a clinic at the Fernald School, containing -- among other facilities -- two children's classrooms, each with observation room and one-way vision and monitoring sound. It was in one of these classrooms, used jointly by the Department of Mental Health and Boston University, that Jay was enrolled. Because it was central to our teacher education program to provide students with an opportunity to view children -- and each other -- over long periods of time for the purpose of developing their skills in observing human behavior and in formulating relevant inferences, an untypically large number of people with varying amounts of professional training and skills were permitted to observe Jay for several months in the nursery school setting, some of whom became involved with him in ways more intimate than as observers. (Blatt, 1964). However, most of the University personnel and student participators played secondary and tertiary roles insofar as Jay's nursery experiences were concerned, except in that they gave important reinforcement to those working with him. It must be said that, from the sheer quantity of their observations and discussions of him, he was a central figure in their lives and development, even if they were not particularly central in his.

From the report of Jay's teacher prepared six weeks after his entrance into the nursery class, and corroborated by our multiple observations, he was described as a sturdy, very well-built boy, with a round face and pink cheeks. The teacher observed no obvious physical stigmata and reported that he gave the visual impression of being a typical three and one-half year old boy. At that time, his verbal patterns appeared immature, although he did use speech to communicate. Sentences were three and four words, generally with infantile pronunciation. He had trouble with "s" sounds and tended to slur them so that they sounded like

"sh-h". He was quite expressive, and in the short time that he had been in attendance, appeared to have shown great development in language. Large muscle play was excellent and he had no trouble in the locomotive area, although small muscle coordination seemed somewhat underdeveloped. It was the teacher's opinion that this was due to an unfamiliarity with materials rather than to a primary impairment in this area. He climbed with ease and zest on all large muscle equipment and showed little or no fear of physical exploits. He was described as a loquacious child, showing anxiety, sadness and joy quite openly.

When Jay first entered the nursery class, he seemed overwhelmed by the materials around him. He did not use them properly but did spend most of his time disassembling the materials which had parts, dumping puzzle pieces on the floor and tables, and rolling the stacking rings across the floor. He enjoyed creative play and spent a great deal of time pasting collages, painting, and playing with water in the kitchen corner. It was in the kitchen corner that his first sustained activity was noted. At first, in all activities, his attention span was quite short, but had lengthened considerably during the subsequent six weeks as his familiarity with the materials had increased. At the end of six weeks he could complete without assistance a five-piece, non-interlocking puzzle and was able to use the ring trees for stacking, and the kegs for opening and shutting. Interest became sustained and play was self-initiated. He now explored with meaning and had a knowledge of how to use and care for the nursery materials.

His initial entrance into school marked the first sustained separation from his mother. As he entered in the morning, he stayed close by her side at all times. During the first few days, as she tried to separate he cried a great deal. However, at the start of the second week of school, Jay entered the classroom tentatively by himself, and managed to survive the morning without mother. During this separation phase, mother was very helpful and participated in making

the separation successful. He eventually related well to all of the other children, appeared quite affectionate to the teacher -- although this was never an excessive display -- and, by the end of six weeks, appeared to have made a very satisfactory adjustment to the nursery environment.

Insofar as self-help activities were concerned during this first six-week period, toileting was partial when school began and progressed very well during the ensuing weeks. He put on his own coat and hat -- sometimes backwards -- although he would just as soon sit and wait for aid from an adult. He ate cookies and drank well from a cup. At the end of six weeks, he approached a point where he was able to help other children in putting toys away and serving juice and cookies.

At the end of this first evaluation period for Jay, his teacher rated his general adjustment to the program as "excellent". The immediate goals set for him seemed to fall in the general area of "discipline". Particularly, there was a problem in teaching him that he couldn't eat all of the foods that the other children eat, a difficulty the parents experienced at home as well. The teacher predicted that, now that he was comfortable in the classroom situation, he might become a discipline problem; however, thus far he had given excellent evidence of very positive adjustment to his discipline.

At the conclusion of Jay's first school year, eighteen weeks after his entrance into the nursery program, the teacher prepared a second evaluative report on his progress, this too corroborated by our observations. His small muscle and large muscle coordination were now rated as excellent, showing right-handedness preference (See P.K.U. Clinic Psychological Report at 3 years-two months for earlier impression of handedness). He climbed well, used the tricycle with great skill, and performed much as one would expect from a three and one-half year old boy. He involved himself in a variety of areas, enjoying block and kitchen corner play in particular. His play continued to be somewhat

immature but he had shown substantial growth during the short time he had been in school. The teacher rated his concentration span as "short", but not in her opinion abnormally so. He completed tasks with little encouragement and stayed with activities much longer now than upon entrance to school. He would work at problems "too difficult" for him but did not frustrate easily.

Jay now spoke quite clearly and in well-formed, but short, sentences. His speech continued to be a "trifle babyish", but at all times appropriate to the situation. Great improvement was noted in language development during the school year. He seemed quite aware of his environment and commented on those around him. He spoke spontaneously and would look smilingly up and say "Hi, Miss Roz" (his teacher). He would tell of special occasions such as a trip to the beach or a visit to his grandmother. He knew the parts of his body and could describe details of pictures or dolls. He knew most names of wearing apparel and could identify such items with ease. He was not sure of most colors, but knew the color "red". He appeared to have begun developing an understanding of time concepts.

Further, by the end of eighteen weeks, he was able to correctly identify: chair, door, light, paper, telephone, doll, shelf, and easel. He was able to follow simple two and three step directions. He used books appropriately and seemed to enjoy looking at the pictures, his favorite story being Tom Visits the Doctor. He had not yet progressed to an understanding of numbers but did know some concepts such as "up-down". He could identify missing objects from a puzzle or picture and could repeat one and two word phrases.

At the end of eighteen weeks, Jay was evaluated by his teacher as being quite social and one who made friends easily in school. At first, his play was solitary but later he developed good relationships with other children. He accepted criticism and adapted readily to all aspects of the nursery program.

During this last evaluation period, Jay became completely toilet trained

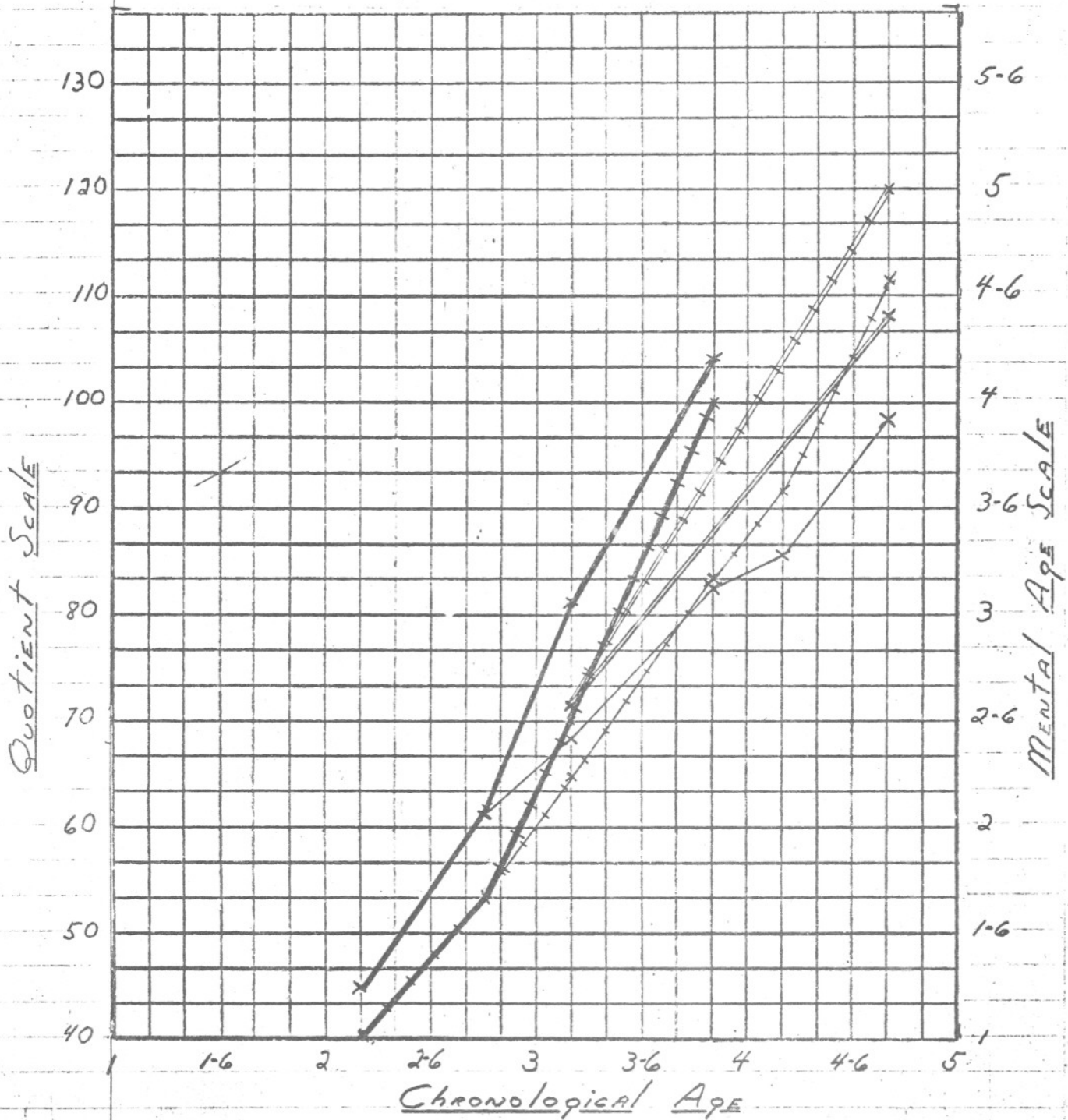
and was able to care for all of his needs independently and well. He was able to accept the food restrictions placed on him without objection.

In a personal communication to us, the teacher commented on Jay's first year in nursery school. She reported his progress as excellent, especially in light of the fact that he was a member of the nursery program for only five months. Peer and adult relationships showed great improvement, as did development of speech patterns, and motor activity. Further, "as a result of this tremendous growth" she recommended that Jay be enrolled in a regular "non-special" nursery class for the following fall.

Outcomes: Pro Tem

Before we go further, it may be salutary to recapitulate a summary of all psychological evaluations of Jay from the time he was first brought to us to the period just prior to his summer vacation, twenty-two months later (see Chart 1 for graphic presentation of all psychological-developmental evaluations). I first evaluated Jay when he was two years old and found him to be moderately developmentally retarded. He received his first full-scale formal evaluation at age two years-nine months where he received an I.Q. of 61 on the Stanford-Binet, a Vineland of 61, and no performance on the Peabody Picture Vocabulary Test. Within a subsequent five month period at about age three years-two months, he achieved scores of 68 and 71 on the Stanford-Binet, 81 on the Vineland, and was able to respond successfully to four cards on the Peabody Picture Vocabulary Test. However, the modest success with his dietary condition, both the teacher's, the parents', and our observations of his striking progress since entrance to nursery school at age three years-six months, and the involvement of so many new meaningful people in his life, caused us to predict that the next formal evaluations -- the first ones since his school enrollment -- would substantiate the impressions of his teachers, his parents, our University students, and those that

Chart 1



Binet I.Q. ————— BINET M.A. + + + + +
R.P.U.T. I.Q. ————— R.P.U.T. M.A. + + + + +
V.S.M. S.Q. ————— V.S.M. S.A. + + + + +

we had, that the results would be much more encouraging.

At age three years-ten months, just after this first year of nursery schooling, Jay was evaluated by the cooperating psychologist at the Walter E. Fernald State School. This evaluation occurred nine months after his previous psychological assessment there. On this occasion, he ran into the testing room by himself, smiling and friendly and eager to begin the test. As the test materials were presented to him, he responded quickly, beaming from ear to ear, and seemed pleased at the completion of each sub-test. The only time that Jay's facial expression changed was when the relatively more verbal and abstract tests were presented. Then he became somber and looked away from the materials, looking back only when a more non-verbal motor test was presented, at which point he became more interested again, responded quickly, and smiled as before. On this evaluation, he achieved a Mental Age of three years-two months and an I.Q. of 82 on the Stanford-Binet. On the Vineland Social Maturity Scale he received a Social Age of four years and a Social Quotient of 104. On the Peabody Picture Vocabulary Test he received a Mental Age of two years-seven months and an I.Q. of 71. Thus, on the Fernald testings -- and corroborated with evaluations at the P.K.U. Clinic and our extensive recorded observations -- Jay's I.Q. rose from 61 to 82 and his Social Quotient from 61 to 104, during a one year intensive medical-pedagogical intervention.

Further corroboration of real change was provided by the staff of the Greater Framingham Mental Health Center. As was mentioned previously, Jay had been enrolled in the Fernald nursery program because the Framingham class was filled, with a discouragingly large waiting list. Six weeks after Jay's entrance to the Fernald class, his turn came for evaluation by the Framingham Center, with a view toward possible placement of him with that group the following Fall. In Framingham, he was seen for three sessions in a diagnostic nursery setting with three other children. In the first session, he said several words and was able

to play simple games as well as play with a trolley toy. He climbed on the ladders and was able to throw a ball. The observers remarked that "he seemed much more mature and normal than all the rest and one wondered whether he perhaps couldn't, in a year or so, be entered into a regular nursery school." During the second session in Framingham, two weeks later, he had difficulty separating from his mother. Finally, the mother was able to leave and he immediately took the initiative with other children, played very well with them, and -- as in the first observation -- impressed the observers in contrast with other children in the group. In the final session, one week later, he separated easily from his mother, was very sociable, and generally seemed comfortable. It was the opinion of the Framingham Mental Health Center that, in a nursery school class with retarded children of his own age, he would be so far ahead of the others that he wouldn't have sufficient opportunities to develop his social and motor skills and, therefore, they recommended that placement in a regular nursery school class for the coming year be considered.

As the aforementioned recommendation was later concurred by Jay's nursery teacher, it was decided that he be placed in a regular summer day camp program, which turned out to be an unusually successful experience for him. With this encouragement, he was enrolled in the recommended regular nursery program for the Fall.

At age four years-two months, shortly after beginning nursery school, Jay was again evaluated at the P.K.U. Clinic. The staff psychologist reported that he was difficult to test, as he constantly wanted to dart outside the examination room to play with his sister in the play room. Further, his attention span was extremely short. However, she did find it possible to get him to direct his attention to the test materials for brief periods of time. On the Stanford-Binet, he achieved an I.Q. of 85 and a Mental Age of three years-seven months. She reported his performance, although fourteen points higher

than on her previous evaluation of him, to be somewhat erratic, due mostly to fluctuations in his attention. No particular strengths or weaknesses were noted in this current response pattern. He passed all subtests at the Year II level and failed all at the Year IV-6. The psychologist recommended that, in view of the fact that there was a significant difference between the scores which Jay obtained last year and those which he obtained in his recent performance, he be retested sometime within the next few months, perhaps before it becomes necessary for him to start public school. In a personal communication from the P.K.U. Clinic staff psychologist to a member of our Boston University Psycho-educational Clinic staff, the belief was expressed that, in spite of Jay's remarkable gains during the past two years, he had probably reached a plateau and one should not expect continued increments on the order of those previously found.

At age four years-eight months, near the end of his first full year of regular nursery school, Jay was evaluated at the Boston University Psycho-Educational Clinic. The examiner was not given any information about his background and our interest and involvement in his development. He struck the psychologist as an engaging round-faced boy with an appearance and social behavior more like a four year old than a five year old. This impression was heightened by his rather "cute" short-pants and gray flannel suit. His babyish, yet rather calculated production of tears on occasion and his resistance to separating from his mother added to the psychologist's impression. Emotionally and socially, he seemed a bit immature for his age. His behavior toward the psychologist was appropriate. He was shy and resistant to accompanying her at first and his mother helped bring him into the examining room, staying with him for a while then returning near the end of the period when Jay became tired and wanted to leave. When his mother left with a remark about going to the bathrrom, he hardly seemed to notice as he was at the time very interested in the test

materials. Although the examiner was able to establish good rapport with him, she did not feel it was a truly warm, friendly relationship. He was properly polite, but not ready to accept the strange examiner as an intimate, certainly an appropriate attitude for a well brought-up little boy who can discriminate between bare acquaintances and intimates, and can behave accordingly.

On the Stanford-Binet he scored a 97 I.Q., and a Mental Age of four years-seven months. His Basal Age on the test was three years-six months and his ceiling was seven years. He achieved an I.Q. of 109 on the Peabody Picture Vocabulary Test, with a Mental Age of five years-two months. On this test, he responded by pointing to the answers quickly and proceeded with little urging until the items became quite difficult for him. Then he appeared to point to the first picture he saw and he became restless, trying to get down from his chair and letting his attention wander. The psychologist reported that the area in which he seemed to need most experience was in "verbal expression". He was parsimonious with words and, although his speech was clear, the psychologist evaluated his expressive language as generally limited. His manual dexterity and coordination were adequate. He had a well-established preference for his left hand, holding a pencil well. The psychologist summarized the evaluation stating that he seemed to be an alert, normal child, perhaps less mature emotionally and slightly less talkative than many children his age, but enthusiastic about the fun-and-games aspect of the testing situation and able to relate appropriately to a strange adult. She felt he seemed quite ready to enter kindergarten in the fall and to proceed with the usual program of reading readiness, group activities and language enrichment.

On the date of this writing, Jay is completely his first full year of regular nursery school. He has been recommended for entrance to the regular kindergarten program in his home town. During this past week (May, 1965), he was a visitor to the kindergarten, having been brought there by our youngest

child as part of the pre-indoctrination program for entering kindergarten children in the neighborhood elementary school. All of us, including his current teacher, expect that he will do well in the regular class.

Discussion

Has Jay changed? Was his intelligence educated? If so, what were those significant conditions that gave rise to the change? We believe we have provided a categorical answer to the first question and a rather strong assertion to the second. As Campbell points out (Harris, 1963, p. 212), we must first question whether a change did occur before we are permitted to ask what caused the change. To answer this first question, we feel justified in relying on Holtzman's assumption (Harris, 1963, p. 109) that, when studying single individuals, time becomes the master variable. Through time, multiple repetitions of measurements and observations are possible and these repeated measurements give power to the evaluations of behavior. It would not have been enough for us to have reported that, in the space of a few weeks after dietary control and family remotivated participation in Jay's education, he progressed with amazing speed and facility through the early stages of oral language -- babbling, imitation, and meaningful speech -- in a telescopic way we had not previously observed in any other child. Nor would it have been enough to report that not too many weeks ago, after seeing the movie Mary Poppins, he came to our door and repeated without error the jawbreaker "super-cali-fragil-istic-expi-ali-docious". The corroborated observations of our University students and his teachers, the current teacher's report concerning his interest and facility with French, and the language I hear him use right at this moment outside my study as I am writing this report, contribute overwhelming evidence to his remarkable progress. Nor, on the other hand, would the impressive psychometric data be able to stand alone as clear evidence of incremented behavior. However, the varieties of changes reported

in the varieties of settings in which he was observed, and the common direction of all of the data, leads us to claim that a rather dramatic change had taken place.

Insofar as our willingness to assert the causes of change, those of us who have worked with and observed Jay believe his improvement occurred as a result of both the medical intervention and the subsequent extraordinary attention devoted to his intellectual development. We are not in a position to infer which intervention -- the medical or the pedagogical -- provided the greatest stimulus to his development. It is more than likely that, with this particular child, substantial development would not have been possible without the presence of both interventions. For those of us who are professionally responsible for the education of children this last statement has particular meaning and importance. Through studying the literature on P.K.U., our University students realized that, in most cases, early detection of this condition, is an absolute requirement to prevent serious subnormality. However, these students had been witness to Jay's development, in spite of a very late diagnosis, and they were puzzled to explain this. We believe their dilemma provided them with a renewed insight insofar as the ability of man to improve -- in spite of serious debilitating odds -- when provided with satisfactory motivation, dedicated instruction, and the involvement of other individuals who are convinced and can convince him that change is both desirable and possible. At one seminar, following an observation of Jay at the Fernald class, our discussion centered around the hypothesis that his P.K.U. condition may eventually be recognized as a disguised blessing rather than a hinderance to Jay's intellectual development. This curious position was advocated after comparison of Jay's rather rapid growth with his sisters' current mediocre school careers. It was suggested that, if the metabolic disorder could be eventually and effectively controlled (there is now general optimism in regard to this), the rather forceful early attention given him may cause

him to surpass his siblings' school accomplishments. At this time, we can only offer very weak speculations about this matter; however, it appears clear to us that the damage to his central nervous system would have progressed without the fortuitous medical intervention but that his "normality" would not have been possible without the pedagogical intervention. To put this another way, to the degree to which Jay was "saved" by the medical therapy, he was -- and is being -- "promoted" by the educational program.

We believe it to be true that, to date, the history of man's unfortunate efforts to apprehend, measure and fathom human change causes one to ponder that what is too often described in our literature as an ordered increment in ability is, more often, a rankly contrived expression of futility.

However, as this case study concludes, we should say that our experiences with Jay encourage us. For a number of years, our central preoccupation has been in testing the hypothesis that intelligence is educable. There is much that we have yet to learn about the nature-nurture interaction, about the most efficient (and sufficient) period to begin interventions, and about the varieties of possible intervention models that may have the greatest desired effects. What has again been brought before us so clearly in this "Didactic Case" is that the hypothesis that intelligence is educable refers both to children and those who must professionally deal with them; and the magnitude to which we can influence the latter, we shall influence the former. In Jay's situation, we are unable to estimate who was influenced more -- he or some of those who were concerned with him. Regardless, we believe that one was strongly affected by the other and, further, for he to have changed we had to.

In a very recent issue of Saturday Review, there is a cartoon of two fish in a fish bowl, with one saying to the other "All right, wise guy, if there's no God, who changes the water every day?" As with the fish who obviously do have their water changed every day, Jay just as obviously changed. At the risk

of being as obtuse (or perceptive) as the fish, we have taken a rather strong position in regard to those conditions that caused his changes to obtain.

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