practically the only two things used for this purpose. Phenol was the *sine qua non.* It did the work just as the author has described it would, and it will still do it if you will use it as he tells us to—that is, in its pure and undiluted form. When used in its pure state it precipitates the albumins in the tissues and prevents its own absorption, but when diluted in any degree whatever there is more or less absorption, danger of poison and of local gangrene around the parts where it is applied. I do not agree with the author in the necessity of neutralizing with alcohol unless the phenol is used to excess and invades some of the surrounding healthy tissue. Although no harm is done if the alcohol is used, it is not necessary, as the phenol will only penetrate a certain distance in any event.

Again, I want to commend the author for once more bringing to our attention this worth while drug which has somewhat fallen into disuse in recent years.

❋

REA E. ASHLEY, M. D. (384 Post Street, San Francisco).—Several years ago I had the pleasure of hearing Doctor Walker discuss the phenol treatment of furunculosis of the external auditory canal. The treatment which he outlined at that time was similar to the one which he now presents for the treatment of infections about the face.

Since that time I have had several opportunities to test the antiseptic properties of pure phenol in infections about the ears, nose, and throat. The results have been so uniformly good that for several years I have also used pure phenol following incision of peritonsillar and retropharyngeal abscesses.

The advantages of phenol, as I see them, are:

1. It is highly antiseptic.
2. It is readily neutralized by alcohol, and thus its action can be accurately controlled.
3. It has escharotic properties which prevent the sealing of the abscess after incision, thus providing free drainage.

In my experience no bad results have been encountered in the phenol method of treatment as described by Doctor Walker. It deserves wider use in infections about the face.

❋

CHARLES WILLIAM BROWN, M. D. (Bank of America Building, San Diego).—Doctor Walker has adequately described the nature of a furuncle, and this should be deeply impressed upon the laity as well as the doctors. Too many are inclined to squeeze and thus bruise the tissues external to the natural protective wall that the body attempts to form for localizing the infection.

The adolescent is one in particular that does so much of this damage, and rightly so, for youth desires rapidly to do away with such a face blemish, when in reality the worst thing that could be done has happened in this bruising of the protective wall, thereby allowing the infection to spread rapidly, especially if it comes in contact with one of the larger veins.

I have many cases to show the damage done in not properly treating the "boils" or infections above the line marked by the angle of the mouth.

The infections in the hair follicles in the nasal vestibule are very trying to many, and I wish to state that many of these furuncles are due to allergic disturbances. In the past year I treated a woman who would have these pimples in the vestibule each time she ate lettuce.

Just last year a boy, sixteen years of age, squeezed a pimple near his nose and lip and it cleared up with treatment, but he developed shortly a perinephritic abscess that necessitated opening and prompt recovery ensued. This case was in the San Diego County General Hospital.

Doctor Walker has given a thorough outline of the treatment of infections of the face, and I am in hearty accord with his method of treatment:

1. Diagnose.
2. Liberate pus, if present, by incision; do not traumatize by pressure, but clean by swab or applicator.
3. Phenol applied as directed. I do not wait two minutes, as Doctor Walker states. The reason is probably fear. When area is deep gray in color, apply pure alcohol and leave in pack or applicator for two or three minutes.
4. Apply loose dressings and give general supportive treatment.
5. In suspected streptococcic infection, sulfanilamid in form of prontolyn or prontosil. Dosage depends on size of the patient and severity of the disease. This is but recently an added treatment, but one I think we should not overlook in giving our patients every opportunity for speedy recovery.

It has been my pleasure to treat many erysipelas and erysipeloid cases of nose and ear, as well as small abscesses, furuncles, fissures; and even the frequent and simple fever blisters respond readily to phenol and alcohol treatment.

In closing, may I urge that this paper be read not only by ear, nose and throat specialists but by men in general practice, who will benefit by using such treatment in general use.

HANDWRITING A NEUROLOGICAL STUDY*

By H. DOUGLAS EATON, M.D.
Los Angeles

DISCUSSION *by Samuel D. Ingham, M. D., Los Angeles; Walter F. Schaller, M. D., San Francisco; Joseph Catton, M. D., San Francisco.*

IN 1622, Baldo, an Italian professor of philosophy, stated: "The study of an intimate letter discloses the thoughts, the moods, and the dispositions of the writer."[1] Notwithstanding this early observation, handwriting has been a subject little studied from the medical standpoint. Handwriting disorders, present in many neurological diseases, and often valuable diagnostic aids, receive but slight mention in foreign neurological literature and still less in our own. This neglect is due to a number of factors. The value of such a study in diagnosis is often only confirmatory—the clinical diagnostic picture may be present before or at least coincident with the handwriting changes. Furthermore, the determination of deviations from normal is made extremely difficult because of the lack of normal standards. Speed of writing production may be measured accurately and a comparison made with normal averages. Style and legibility, on the other hand, do not lend themselves readily to estimation and comparison, save perhaps from a medico-legal standpoint, as in determining a forgery.

In graphology, or the study of handwriting, departures from the normal may occur in form or content; we may have, as Joffrey suggests, calligraphic or psychographic disorders.

Disorders of the content of handwriting, psychographic disorders, are of interest solely from the psychiatric standpoint and do not come within the scope of this paper. I may mention, in passing, that the written productions of a psychotic patient frequently give sufficient information to make possible a diagnosis of the type as well as the presence of a psychosis. Some years ago, in a study of 1,500 letters, comprising the so-called "Nut File" of the Los Angeles Police Department,[2] this was clearly demonstrated. Automatic writings may yield much subconscious material of value in a psychoanalysis of their author.[3]

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* Read before the Neuropsychiatry Section of the California Medical Association at the sixty-sixth annual session, Del Monte, May 2–6, 1937.

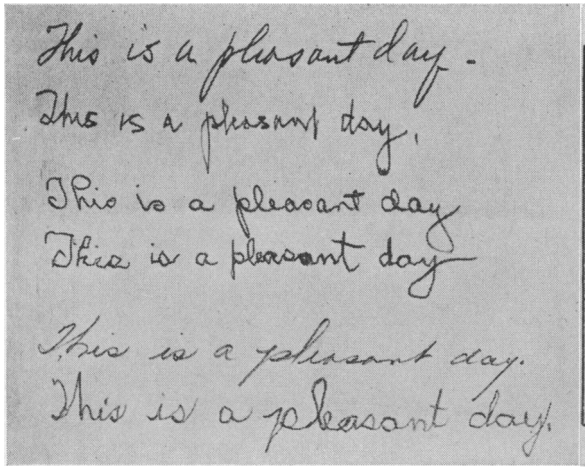

Fig. 1

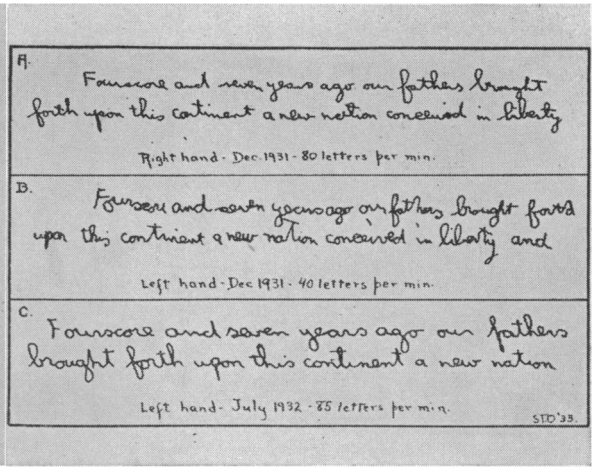

Fig. 2

Fig. 1.—Comparison of right and left-handed writings in dominately right-handed individuals. Illustrates variations in slant, form, speed, and resemblances.

Fig. 2.—(A) Left-handed dominance in all activities forced to write right-handed from age 11 to age 17. Stutterer. (B) Left-handed writing without training. (C) Left-handed writing after six months' training, speed greater than right. Taken from Orton.[4]

HANDWRITING DISORDERS IN NEUROLOGICAL CONDITIONS

The purpose of this paper is to present and discuss some of the recognized types of handwriting disorders found in neurological conditions.

The acquirement and production of normal handwriting is obviously dependent on (1) an intact central nervous system and (2) correct training of an organically sound central nervous system. As normal writing results from the interaction of a visual, a kinesthetic, and an auditory record—disorders in any or all of these or in their interrelationships may presumably result in handwriting disorders. The acquirement of visual records may be interfered with through gross refractive errors. There may be marked individual variations in muscle sense, both in health and disease. Sound association disturbances probably occur, but have not been proved as yet to be of primary importance.

CHILDHOOD TYPES

In childhood, delays in learning to write, or handwriting disorders, may be due to lack of cerebral or cord tissue and to toxemias, inflammations, traumas, lacerations, or hemorrhages affecting the central nervous system. Here lack of or actual destruction of nerve tissue results in absolute or partial inability to write. In such conditions associated evidence of other motor dysfunction is usually present, as in the spastics and dystonias. This is a fairly obvious group. Mild types must be borne in mind and ruled out before making the diagnosis of a purely functional disorder.

Another type occurring in childhood is called congenital apraxia. These children with normal intelligence, without definitely demonstrable motor or sensory lesions, and without evidence of organic pathology, yet show difficulty in learning all motor patterns which require a high degree of complexity of muscular movements. They show fair skill in the simpler, phylogenetically older, movements such as walking, running, or grasping, yet are poor in sewing, dancing, or tennis. In this group, writing sometimes remains a difficult problem throughout life.

Incorrect training of an essentially sound nervous system usually arises from errors in the use and development of the dominant hemisphere as indicated by the work of Orton and others.[4] Children forced to use the right hand in writing when

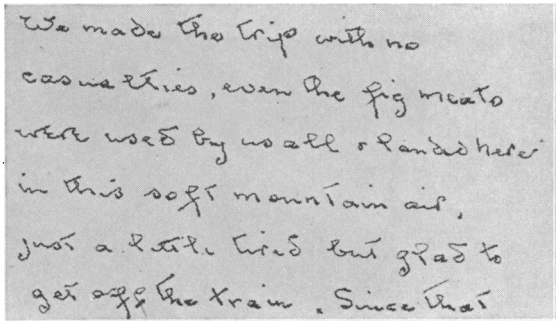

Fig. 3

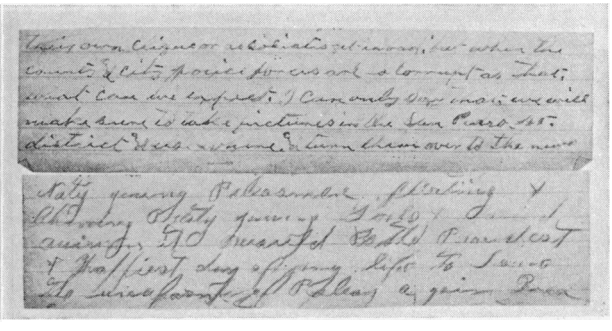

Fig. 4

Fig. 3.—Illustrating tremor, waviness, and slight cramping. Male, age 61. Cardiovascular changes without hypertension. One cardiac accident, no cerebral; fundi arteriosclerotic.

Fig. 4.—Illustrating tremor, waviness, cramping, illegibility. Male, age 75. Senile changes without demonstrable pathology. Male, age 76. Senile psychosis without focal lesions.

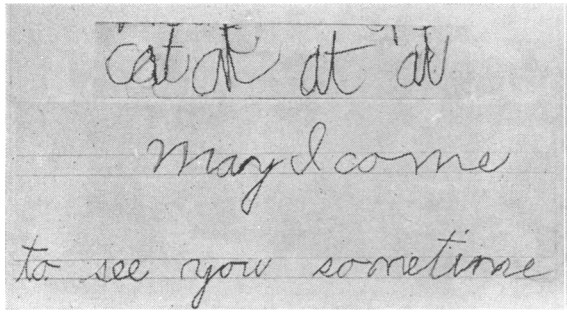

Fig. 5

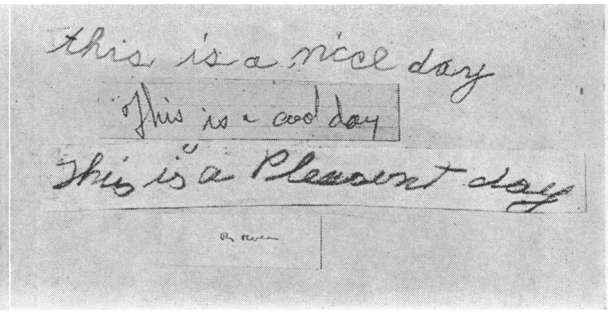

Fig. 6

Fig. 5.—Illustrating tremor, faulty alignment, illegibility. Female, age 8. First line after one year public school.

Fig. 6.—(A) Illustrating waviness, faulty alignment, lack capital. Female, age 12. Little's disease with conduct abnormalities. (B) Cramping, faulty alignment. Male, age 32. Encephalitis lethargic, chronic type. (C) Tremor—cramping, faulty alignment. Male, age 18. Little's disease, psychoneurosis. Can only write while standing. (D) Micrographia. Normal individual.

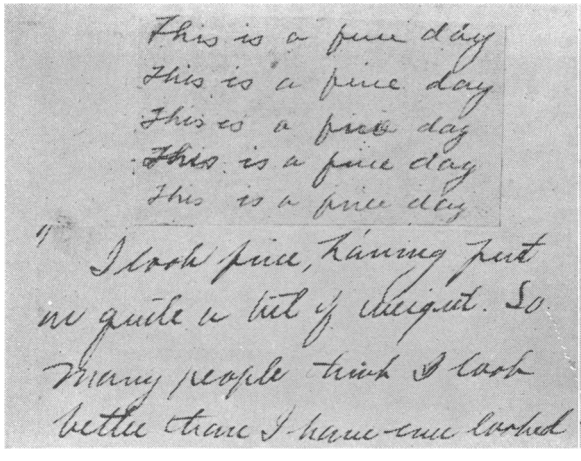

Fig. 7

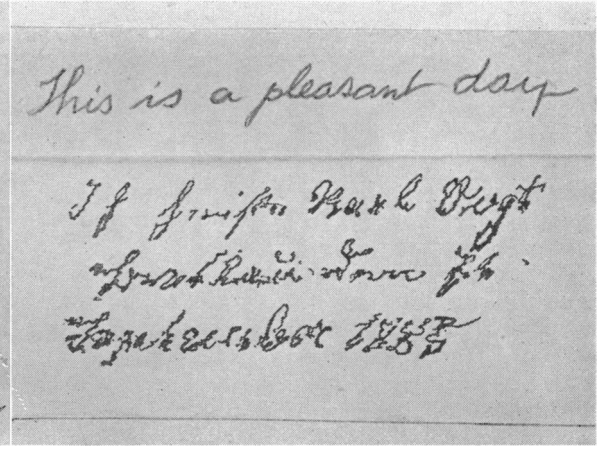

Fig. 8

Fig. 7.—(A) Illustrating difficulty in starting, dropped letters, and increasing cramping on sustained effort. (B) Normal handwriting eight years later. Female, age 30. Encephalitis lethargica. Parkinsonian syndrome, infection at age 23. Positive neurological findings.

Fig. 8.—(A) Illustrating tremor, micrographic tendency, increasing cramping and faulty alignment with fatigue. Male, age 51. Paralysis agitans onset at age 48. No antecedent infection. (B) Male, age 56. Paralysis agitans onset at age 50. No antecedent infection.

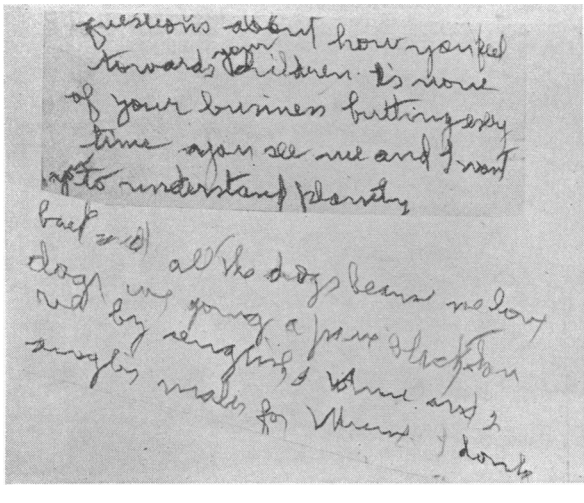

Fig. 9

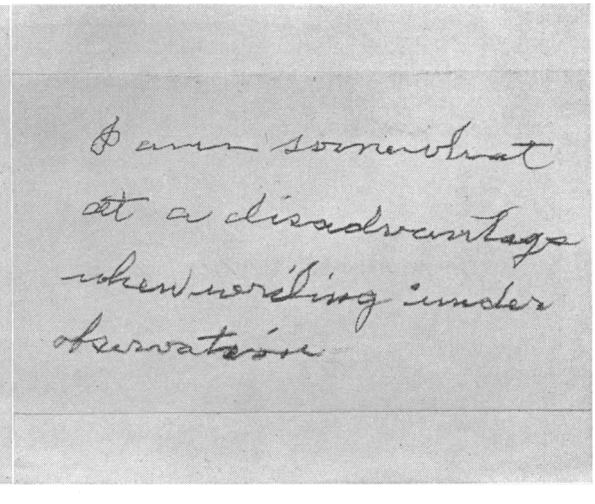

Fig. 10

Fig. 9.—Illustrating cramping, faulty letter formation, repetition of words, omission of letters and words, faulty alignment. Increased deterioration eighteen months later. Female, age 41. Huntington's chorea with dementia, maternal inheritance with alcoholism and mental instability. Coronary death at age 46.

Fig. 10.—Illustrating uncertainty, tremor, cramping, faulty alignment, faulty letter formation. Male, age 54. Multiple sclerosis. Onset at age 39. Progressive with remissions.

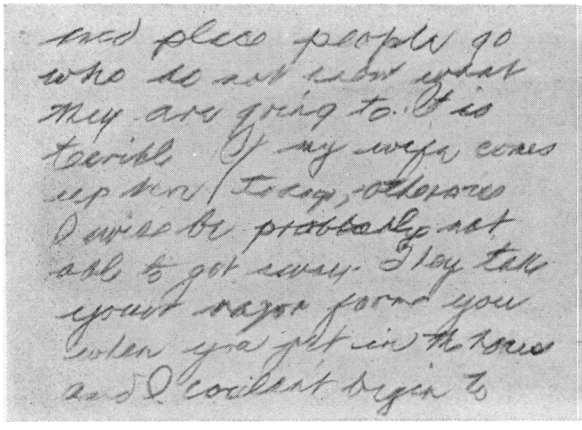

Fig. 11

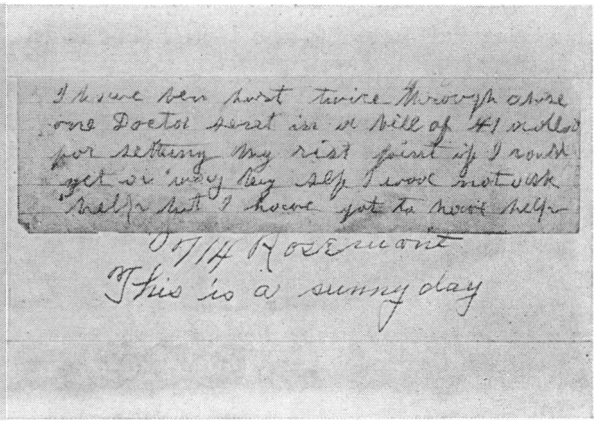

Fig. 12

Fig. 11.—Illustrating slight tremor, cramping, faulty alignment, omission of letters and words, illegibility. Male, age 52. Paresis. Chancre at age 33. Malaria previously. Scattered treatment, no check for fifteen years. Typical serology. Duration mental symptoms two months.

Fig. 12.—Illustrating tremor, cramping, omission of letters and words, faulty alignment, illegilibity. Male, age 58. Chancre at age 30. Typical serology. Duration mental symptoms six months. Female, age 43. Chancre questionable. Typical serology. Duration of mental symptoms, four months.

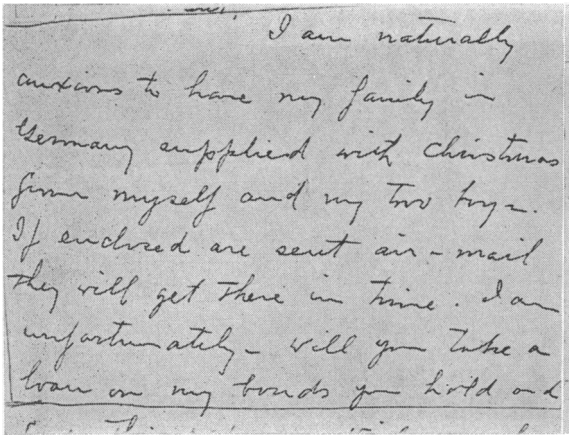

Fig. 13

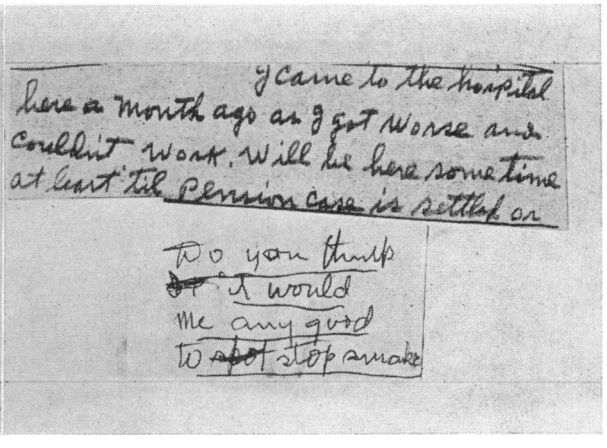

Fig. 14

Fig. 13.—Illustrating slight tremor, faulty letter formation, faulty alignment, omission of letters and words. Male, age 43. Chancre at age 28. Typical serology. Continuous treatment including malaria.

Fig. 14.—(A) Illustrating waviness, tremor, faulty alignment. Male, age 41. Alcoholism with peripheral neuritis. (B) Uncertainty, cramping, faulty letter formation, omission of letters and words, faulty alignment. Male, age 56. Progressive muscular atrophy with bulbar symptoms. Onset at age 46.

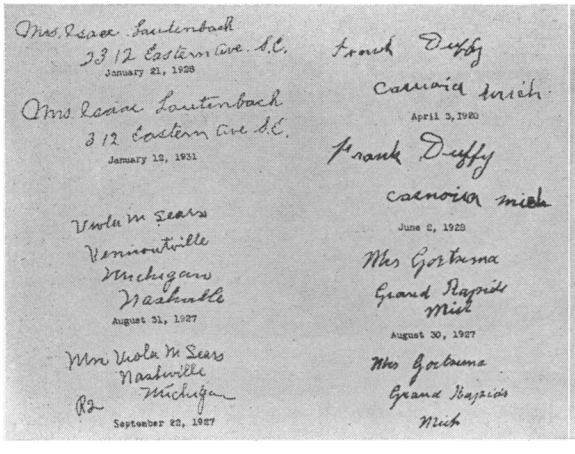

Fig. 15

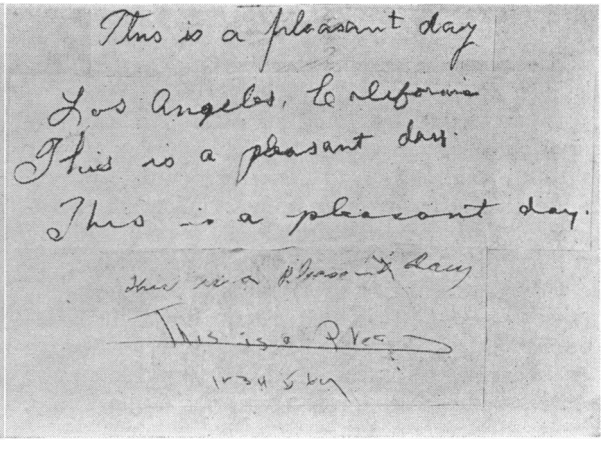

Fig. 16

Fig. 15.—Illustrating tremor, cramping, faulty alignment, illegibility. Toxic goiters pre- and postoperative. Taken from Berg.[5]

Fig. 16.—(A) Illustrating tremor, slight cramping, faulty alignment. Male, age 55. Writers' cramp, onset at age 53. Pullman conductor, both hands involved. (B) Tremor, cramping, faulty alignment, micrographic tendency. Male, age 48. Writers' cramp. Onset at age 31. Lawyer, one hand involved. (C) Tremor, cramping, micrographia, illegibility. Male, age 46. Writers' cramp. Onset at age 36. Auditor. Both hands involved.

dominately left-handed, or allowed to use the left in writing but forced to use it in right-handed positions, frequently show persistent slowness and disability in writing. Such writing disability may also be associated with definite developmental disorders. Children taught to write with the right hand, but allowed to use the left for all other activities, may show writing disorders due to lack of clear-cut hemisphere dominance. In this group are also found reading and spelling disabilities, cases of so-called strephosymbolia. The early recognition of these cases is important to permit early special training; to guard against their being classed as mentally defective and to prevent the development of psychoneuroses. Some years ago I examined such a patient, now in college, whose history discloses repeated psychoneurotic episodes occurring during the period of his life when, though dominately left-handed, he was being forced to write right-handed. Correction of this error, together with proper training, eliminated the psychoneurotic episodes and resulted in markedly improved academic standing.

This group of early functional handwriting disorders which I have just discussed are found much more commonly in males than in females—approximately in the ratio of six to one. Evidence of similar writing disabilities is found in the family histories of these cases, and it is, therefore, believed that there is a sex-influenced hereditary factor present.

HANDWRITING DISORDERS IN ADULTS

In adults the types of handwriting disorders just discussed are relatively unimportant, and the disorders caused by acquired diseases are of more interest. As in childhood, diseases resulting in organic central nervous system changes are of prime importance. Cerebral hemorrhage, associated with cardiovascular disease, or trauma, involving motor areas and pathways, results in varying degrees of handwriting disturbances, from slight tremor with wavy up-and-down strokes and cramping to complete agraphia. Without gross or demonstrable lesions we see the tremulous cramped writing of the senile.

Tremor and uncertainty are present in encephalitis. Multiple sclerosis is said by one author to be characterized by "wild scrawls." In my own experience, either no definite changes or tremor and uncertainty, as found in encephalitis, is more common. Paralysis agitans shows typically a micrographia and tremor, which grows progressively worse in proportion to the length of the production. Paresis has received more attention from the handwriting standpoint than any other neurological condition, probably because the changes in this disease are so easily demonstrated. The omitted letters or words, with the extreme tremor and illegibility, are readily recognized.

The various toxemias often make themselves apparent in the written word. The handwriting disturbance caused by excessive indulgence in alcohol is familiar to us all, at least in others. Some years ago Berg called attention to the tremor of toxic goiter and its improvement postoperatively.[5] In the group of toxemias we find disturbances in the finer movements, carelessness in form, tremor; and in the severer alcoholic toxemias especially, omission of words or sentences, needless repetition, and increasing illegibility.

WRITING DISORDERS OF FUNCTIONAL ORIGIN

The classical example of writing disorder of functional origin is to be found in so-called writer's cramp—here we see demonstrated in the early stages an extremely cramped micrographia; in the latter stages an illegible scrawl.

The one case of Huntington's chorea studied resembles the production of a paretic with marked tremor, illegibility, omitted words and letters, and extremely faulty aligment.

In summary, the study of handwriting disorders in childhood often result in the recognition of organic or developmental disturbances of definite educational value. A similar study of adult productions may be of definite diagnostic value. Further study is warranted.

1136 West Sixth Street.

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DISCUSSION

SAMUEL D. INGHAM, M. D. (727 West Seventh Street, Los Angeles).—The material presented by Doctor Eaton is very interesting and suggests a field of diagnosis that has not been sufficiently developed in the neurological direction, although certain handwriting experts have studied the subject extensively.

In connection with the applications which Doctor Eaton has suggested, the variations in handwriting which occur with organic nervous diseases might be considered in relation to the location of the pathology in the nervous system. Thus, lesions of the spinal cord causing weakness or incoördination of movement in the hands, lesions in the cerebellum causing dysmetria, lesions of the mid-brain causing intention tremors, lesions in the diencephalon causing nonintention tremors, and lesions in the cerebral cortex causing different types of paragraphia, each give a different and characteristic change in the handwriting from that which is normal to the individual.

Study of a large number of cases, and an analysis of the different abnormalities in writing, would no doubt be of aid in neurological diagnosis and localization.

❋

WALTER F. SCHALLER, M. D. (909 Hyde Street, San Francisco).—Doctor Eaton has given us, in a concise manner, the pathological aspect of handwriting, which is quite as important in clinical diagnosis as other signs of abnormal motor behavior, such as gaits, attitudes, disturbance of associated movements, and uncontrolled motor acts. Excluding cases of mental defectiveness, lack of training

in writing, carelessness, those due to brain lesions or other structural changes, there remains a definite group of specific handwriting difficulties, frequently unrecognized as such in school children. This may exist in rare cases as an isolated defect, but is more frequently found in developmental alexia, the strephosymbolia (or twisted symbols) of Orton, in which spelling and writing are likewise affected, to even a greater degree than reading, because recognition is easier than recall. A sample of handwriting, therefore, may lead to the diagnosis of developmental alexia. The writing of these children is fairly characteristic in the reversals of words and letters, especially the letters *d* and *b*, *p* and *q*. They frequently show other evidences of mirror reading and writing. Children with this hindrance find it exceedingly difficult or impossible to learn to read by the flash-card method, as opposed to the phonetic system; instruction in the latter method often aids greatly in their ability to read as well as to write. Individuals who are dominantly left-handed should not be forced to write right-handed, and when left-handedness exists as a biological deviation in the nature of a regressive character, especially when accompanied by other such signs, the handicap imposed on these children by switching, even when they are not markedly left-handed, is such that they cannot readily adapt, and they may develop psychoneurotic reactions, including stuttering.

❋

JOSEPH CATTON, M.D. (490 Post Street, San Francisco). Neurological, psychological, and psychiatric studies of handwriting will always be important. I share Doctor Eaton's chagrin that so little authoritative work has been reported in the literature, both here and abroad. Doctor Eaton's paper concerns itself with those aspects of handwriting where one's feet may be kept on the ground; it deals with factual, solid stuff. I hope he may continue his researches into more dangerous fields, for I am one who believes there are important findings to be made where gross neurological disorder is not present.

Without "the will to believe" (I hope) I have recently submitted six specimens of handwriting to a so-called "graphologist." She holds an important position in the American Institute of Grapho-Analysis. All identification data were deleted from the letters sent. Here are my estimates of her analyses, compared with full medical and psychological records in my possession.

Specimen	Analysis Per Cent
A killer in death row at San Quentin	20
A radio personality; alcoholic, unadjusted	95
A woman, homosexual, artist, taking drugs to alleviate distress of larynx carcinoma	85
A dramatic editor of a newspaper, three days before committing suicide	70
A paranoid praecox, killer, residing in State Hospital	80
A member of the California Medical Association Council	90

Average estimate, 73 per cent.

This "analyst" has for years read handwriting for the National Board of Fire Underwriters; their general manager wrote her during March, 1938: "Received analyses, and we find them, as usual, 100 per cent correct." I report this only to suggest that before final "yes" or "no" may be given to the value of "graphology," it would be well to take a thousand specimens of norms, psychotics, neurotics, etc. Eliminate all identification data; have competent persons take clinical records to which numbers have been assigned, and make cold comparisons with "analysts" reports, and . . .

Back to earth! Content of manuscript, time, and lineage factors are important and must be understood. Quinan (I have seen his blind approach to final analysis of data) picked out the executives, small department heads, and men in lower positions on police force and in industry by time and lineage readings of the test written sentence, "He protested that he couldn't eat the twenty-two tarts; and the truth is that he ate twenty." Quinan, again, found that the crossed types (one eye dominant and the heterolateral hand being used for writing) were present in much higher percentages in speeders, reckless drivers, dementia praecox, constitutional psychopathy, artists, musicians, and preachers.

THE NUTRITIONAL PROBLEM IN TOXEMIAS OF CONTAGIOUS DISEASES*

By MILTON TOBIAS, M.D.
Los Angeles

DISCUSSION *by John C. Ruddock, M.D., Los Angeles; Albert G. Bower, M.D., Hollywood; George M. Stevens, M.D., Los Angeles.*

IN toxemias, accompanying contagious diseases, the dietary regimen is too often a casual addendum to a carefully planned treatment. Fluids are forced; glucose is introduced parenterally in conjunction with a high carbohydrate, a maintenance or low protein, and an abundant vitamin intake. We challenge the competency of such generalities; in their stead, we suggest the physiological determination of metabolic needs and of gastro-intestinal misbehavior.

In disease, as in health, nutrition is correct and its balance is positive when all requirements for maintenance and growth are fulfilled. These requirements are established by the unique physical, chemical, and energy phenomena peculiar to the current metabolic situation. Conditioned by an increased metabolic rate, by an increased catabolic activity (cellular wear and tear), the previously positive becomes a negative metabolic balance. To paraphrase, "The metabolic balance is in the red." The toxic patient must have correspondingly abnormal and augmented nutritional demands. These increased demands, ordinarily, are satisfied by reserve depots whose sufficiency makes autogenous convalescence possible.

NUCLEOPROTEINS AND PHOSPHOLIPIDS

From the manifold ramifications of the nutritional problem in toxemias, the inclusion of abundant nucleoproteins and phospholipids was selected for clinical study. Insulin administration was included in our procedure.

A schematic discussion of both cell and liver will make our hypothesis more intelligible. The vital structure of every cell is a colloidal system in which nucleoproteins and phospholipids participate.[1-4] The source of energy for cellular activity is primarily the utilization of glycogen; and the control of cellular behavior is affected by the interchange of substances with its immediate environment. There occurs, in nice equilibrium, a constant flux of electrolytes, hormones, enzymes, and nutritional elements to and from the cell. The introduction of any toxic irritant into this extracellular medium, disturbs protoplasmic chemistry; interferes with the precise mechanism of cellular function; provokes cellular sacrifice; and, commensurately, destroys nucleoproteins and phospholipids.[5,6] Since the nucleoprotein and phospholipid content of normal tissue is fairly constant,[7] their increased destruction should necessitate a compensatorily increased intake, replacement sufficient to convert their negative into a positive balance.[9]

The liver, like all body tissues, is probably profoundly and unfavorably influenced by a severe

* Read before the General Medicine Section of the California Medical Association at the sixty-sixth annual session, Del Monte, May 2–6, 1937.