Influenza and Hypophrenia

The Interrelation of an Acute Epidemic Infection and a Chronic Endemic (Brain) Affection

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THE INTERRELATION OF AN ACUTE EPIDEMIC INFECTION AND A CHRONIC ENDEMIC (BRAIN) AFFECTION *

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Influenza seems to have had certain neuropsychiatric effects. It is these effects which are to us as physicians most important from the pragmatic standpoint, rather than any hypothetic propositions of cause. These concrete effects we may approach as tangible globar material, and it is the essence of pragmatism that to capitalize this concreteness will in the end yield results nearer truth than the spinning, however deft, of tenuous inductive hypotheses. Hughlings Jackson put it that "the study of the thing caused must precede the study of the cause of the thing."

The whole subject of mental defect stands in a fair way to illustrate the value of the pragmatic point of view. After hundreds of years of desultory search for causes, we have within the last few decades turned our attention to the effects of feeblemindedness, with the result that more advancement has been made in that short space of time than in all the preceding centuries; for the fact remains that however important the cause (and who will deny this?) it is in general a thing difficultly accessible; yet, in the pursuit of it, the obvious data of effects, from which so much can be learned, have been ignored.

Influenza, as I would demonstrate, had certain definite effects on hypophrenia, or feeblemindedness. The importance of this fact, and these data, in arriving at a correct conception of the nature of feeblemindedness must be obvious. Yet that such effects of

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influenza have ever occurred appears to be a naive observation. I mean simply that the literature is almost barren of any discussion of the matter. The whole problem of the effects of acute infections on the brain and its diseases is a strangely neglected one, and particularly is this true of feeblemindedness. It is only from the standpoint of alleged cause that infectious disease is discussed by writers on feeblemindedness, and even as such it is not even mentioned by many of them, and by others only casually.

Thus, to illustrate, Tredgold in his well-known treatise on mental defect, devotes only eighteen lines (1908 edition) of the nearly 400 pages to the discussion of infections as causes of hypophrenia. Ireland devotes a chapter to “Inflammatory Idiocy,” but it is not very illuminating, and infectious disease is not mentioned in the chapter on “Causes of Idiocy.” Bourneville was apparently more interested in the structural alterations wrought than in the modus operandi by which they were wrought. In a cursory search of his reported cases, I find no discussion of infections as a causative factor in mental defect. The standard English textbooks of psychiatry either make no mention of the matter or refer to it briefly.

Occasionally one finds some attempt at statistical solutions. Thus, in Piper’s statistical compilations there are reported seventy-five cases of acquired idiocy without convulsions: 29 per cent. were due to scarlet fever and diphtheria, 12 per cent. to measles and 8 per cent. to encephalitis. Of thirty-two cases of acquired idiocy with convulsions, 22 per cent. were traced to scarlet fever and typhoid and 10 per cent. each to measles, “gastric fever” and encephalitis. This is roughly equivalent to finding 40 per cent. of acquired idiocy due to infectious diseases. The statistics of other writers do not bear out these high figures. For example Koernig, in a list of 260 cases of idiocy, carefully analyzed as to etiology, found 3.4 per cent. (he questions whether this should be lowered to 2.3 per cent.) due to infectious diseases aside from syphilis. Even in his list it ranks above traumatism as a cause, and several times greater in frequency than the oft-cited consanguinity of parents. Pearce cites several tables. Beach and Shuttleworth’s figures from the Royal Albert Asylum are given, showing “acute infectious fevers” to be causative in 119 of 1,200 cases. Figures for 1,180 cases from the Darenth asylum are also quoted without the mention of infectious diseases! Tredgold gives a table to show the postnatal extrinsic causes; of the 150 cases studied, thirty-seven cases, or nearly one-fourth, fall in this group, but of these only seven are ascribed to “infectious fever.” It is surprising that so capable a writer should have ascribed no less than ten cases to “teething convulsions” [sic].

There seems to be no doubt but that syphilis may be a cause of feeblemindedness. This, however, opens up too big a field for present discussion and is really beside the point, since we are here dealing with acute infections, and syphilis must certainly be regarded as chronic.

The classification of G. E. Shuttleworth and Fletcher Beach of England should be mentioned. In general, it consists in grouping the forms of mental defect according etiology, as congenital, developmental and accidental. Waiving the obvious deficiencies of a scheme which does not foresee the conflict between the second and third groups as given and named, I shall proceed to the minutiae of the third group, with which we are now concerned. They recognize under the “acquired” or “accidental” etiology group a traumatic form, a sclerotic form, and a postfebrile

4. Church and Peterson, Jelliffe and White, Paton, Defendorf, O DeFursac, etc.
8. These figures are taken from Tyler’s Dictionary of Psychological Medicine 2: 659-665, 1892.
form. Again, passing the first two items of a series of three (one is struck by the trinitarian tendencies of the writers), we read that this is “another important type,” and measles, pertussis, typhoid and scarlatina are specifically mentioned. These authors proceed then to the pathogenesis. This subject is discussed in greater detail by other writers, e.g., Bolton, Hammarberg, and above all, the elaborate monograph of Fernald, Southern and Taft. Shuttleworth and Beach apparently attempt to mask their study of the infectious factor by a show of words: “These diseases cause inflammation of the brain and its membranes, or are complicated with it not sufficiently grave to be fatal, but serious enough to cause mental impairment.” Added to this vague affirmation they quote Ireland as saying “Truly” the following banality: “The amount of damage to the intellectual powers must be mainly dependent upon the intensity of the morbid process.” If by the phrase “morbid process” Ireland meant the systemic disease supposed to precipitate the hypophrénia, we know that in the case of influenza, at least, he was utterly incorrect, since it is certainly quite generally agreed that the severity of the mental sequelæ of influenza bears no relation whatever to the (apparent) severity of the clinical symptoms of the disease.

Another statement of the writers is more worthy of note, ambiguous though it be: “Of course, if one of the diseases we have mentioned should occur in a child previously disposed to imbecility [sic] this affection is more likely to follow it.” One is not at all sure just what the writers meant, but perhaps it was to signalize the process of aggravation or intensification of preexistent hypophrénia by acute infectious disease.

METHODS OF STUDY

What is the effect of influenza re feeblemindedness? This is the specific question of my research. More minutely, it is to learn whether or not influenza does or can produce frank mental defects, and whether or not it alters for better or worse the mental status of patients with an already existent mental defect. These questions are really put to us, not by the influenza epidemic, but by the progress of study and research concerning hypophrénia. The influenza epidemic has contributed data to their solution.

The collection of these data was thus made: In the first place, to insure a wide sweep of material, questionnaires were prepared and sent to the superintendents of all state institutions for mental defectives except those located in states where the influenza epidemic was inconsequential.

About 75 per cent. of all the letters were answered. These answers were in general kindly and carefully made, in most cases a letter of particulars being sent. There was no equivocation or evasion in the replies. The total number of institutions replying was seventeen. I appreciate the cooperation and help of the institutions that replied, which are:

Rhode Island School for the Feebleminded, Slocum, R. I., Dr. Joseph H. Ladd, superintendent.
Massachusetts School for the Feebleminded, Waverly, Mass., Dr. Walter E. Fernald, superintendent.
New Jersey State Institution for the Care and Training of Feebleminded Girls and Women, Vineland, N. J., Dr. M. A. Hallowell, superintendent.
State of New York Letchworth Village, Thiells, N. Y., Dr. Charles S. Little, superintendent.
State Institution for the Feebleminded of Western Pennsylvania, Polk, Pa., Dr. J. M. Murdich, superintendent.
Nebraska Institution for Feebleminded, Beatrice, Neb., Dr. D. G. Griffiths, superintendent.
Institution for Feebleminded, Columbus, Ohio, Dr. E. J. Emerick, superintendent.
Syracuse State Institution for Feebleminded Children, Syracuse, N. Y., Dr. O. H. Cobb, superintendent.
The State Home and Training School for Mental Defectives, Ridgeland, Colo., Dr. A. P. Busey, superintendent.
Sonoma State Home, Eldridge, Calif., Dr. F. A. Butler, medical superintendent.
Wisconsin Home for Feebleminded, Chippewa Falls, Wis., Dr. A. W. Wilmarth, superintendent.
Huntington State Hospital, Huntington, W. Va., Dr. L. V. Guthrie, superintendent.
Oregon State Institution for Feebleminded, Salem, Ore., Dr. J. N. Smith, superintendent.

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12. Teedgold (Footnote 9) adds smallpox and syphilis.
16. This point has been made by numerous writers, e.g., Jolliffe, Menninger, Althaus and Fell.
State Institution for Feebleminded, Medical Lake, Wash.,
Mr. S. C. Woodruff, superintendent.
State Custodial Asylum for Feebleminded Women, Newark,
N. Y., Dr. Ethan A. Nevin, superintendent.
Rome State Custodial Asylum, Rome, N. Y., Dr. Charles
Bernstein, superintendent.
State Home for Feebleminded, Winfield, Kan., Mr. Wylie
W. Cook, superintendent.

The first question asked was: "How many, if any,
cases of mental defect or feeblemindedness were
admitted to your institution since the recent
epidemic in which the influenza was given as a precipitating
or contributing factor?"

To this question there was a unanimous answer of
"None." If the average admission rate holds for the
institutions from which replies were received, this is
equivalent to saying that of more than 500 new
patients with mental defects admitted since the
influenza epidemic to seventeen leading state institutions
for the care of these patients, in not a single
instance was influenza even mentioned as a precipitating
or contributing factor.

The second question was: "How, if at all, were the
patients of your institution, who had influenza in the
recent epidemic, affected by that disease as to possible
amelioration or augmentation of their mental
defect?"

Of the seventeen replies, fifteen were unanimous to the
effect that no amelioration or augmentation of symptoms was observed, or at least none that could
be made sure of or was worthy of note. One writer
spoke of psychotic sequelae, a matter to be taken up
later in this paper. Another writer (Dr. W. E.
Fernald, of the Waverly School) writes that while "as
a rule" the patients were unaffected by influenza as
far as mentality was concerned, "one patient, an old
menigitis case, improved very much after her acute
symptoms subsided." There was frequent mention of the
frequency of tuberculosis in patients after influ-
zenza, and some comment on altered physical states,
but no other observations of altered mental state or
capacity.

To summarize: Of seventeen institutions with a
total population, according to the figures of the super-
intendents, of over 16,000, in only two institutions and
in one of them in only one case, was any relation
observed between influenza and mental defect. Surely
one might consider this a definite answer to the pro-
posed questions.

SECOND METHOD OF STUDY

As a matter of fact, the surprisingly barren results
of the first method are probably misleading. The
fallacy may lie in the inattention to details which the
pressure of executive work, influenza itself and short-
age of professional help combined to make inevitable.
It may lie in the crudity of our standards of compar-
ison, our clinical psychometry. It may lie in the word-
ing of the questions.

But wherever the location of the fallacy, fallacy we
must believe it to be in the face of data acquired from
scanning specific cases encountered in private practice
and neuropsychiatric dispensaries and hospitals. From
such sources the cases reported herewith are taken.17

These cases of hypophrenia influenced by influenza
may be divided for the purposes of study into six
groups, three under the heading of "Simple or Uncom-
plicated Hypophrenia," and three under "Complicated
Hypophrenia." All but two patients of the series were
hypophrenic to begin with. Thus we possess no defi-
te evidence that influenza can produce hypophrenia
(as distinct from a hypophrenic, i.e., demented, form
of psychosis, which is of course beyond dispute). Nor
does the literature help us on this point. The only
reference whatever to the matter which I could find
after a careful search is this from Paton's book:

Not a few children, born healthy, after a severe attack of
diphtheria, influenza, measles, scarlet fever, typhoid fever or
meningitis, are left mentally deficient.

17 Of the following cases, six are from our Boston series (Menninger,
[Jan. 25] 1919), from which previous studies have appeared (the
reference just given; Footnote 16, and Menninger, K. A.: Influenza
and Neurosyphilis, Arch. Int. Med. 34: 92 [July] 1919). There were
reported in a letter to the writer from Dr. Joseph H. Ladd of the
Exeter School of Rhode Island, at Slocum. Two of the patients were
seen in private practice in this state (Kansas), one by Dr. O. S. Hub-
bard, superintendent of the Kansas State School for Epileptics, in
consultation with another physician, and one by the writer in consul-
tation with Dr. W. S. Lindsay, of Topeka, Kan. To all of these men
credit is hereby due awarded, and an expression of gratitude
proffered for their kindness in putting at my disposal the data on the
cases that I did not see.

The following cases are presented, not to illustrate alone the formula:

\[
\text{Normality} + \text{Influenza} = \text{Hypophrenia}
\]
(although two of the cases might be so represented), but perforce to illustrate the various forms of conclusion to the paradigm:

\[
\text{Hypophrenia} + \text{Influenza} = X
\]

Under the caption of Simple or Uncomplicated Hypophrenia (as opposed to hypophrenia with complicating factors or tendencies), there are three groups, easily separable on the basis of Southard's ingenious scheme for labeling the qualitative variations in the psychic constitutions of hypophrenics. The groups are:

1. those with intellectual sphere disturbances conspicuous;
2. those with emotional disturbances uppermost, and
3. those with conduct disturbances prominently intensified after influenza.

Or, to use Southard's nomenclature, these three groups might be thus labeled:

Group 1. Hypognosis = the prominent psychic product of influenza.

Group 2. Dysthymia (parathyemia or hypothymia) = the prominent psychic product of influenza.

Group 3. Parabulia = the prominent psychic product of influenza.

The complicated cases require a somewhat different approach. They, too, fall into three classes:

Group 4. Hypophrenia with neurologic manifestations prominent.

Group 5. Hypophrenia with psychic manifestations prominent.

Group 6. Hypophrenia with psychopathic manifestations prominent.

These, like the elements of the preceding group, may be abbreviated, as:

Group 4. Hypophrenia with encephalopathy.

Group 5. Hypophrenia with psychosis.

Group 6. Hypophrenia with psychopathy.

Each of these six groups will be taken up separately and illustrated with the appropriate cases.

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**Simple Hypophrenia: Group 1. With Intellectual Disturbances Conspicuous**

Hypophrenia with disturbances (loss) in the intellectual sphere prominent following influenza (or hypophrenia, with hypognostic aggravation by influenza) is, of course, the only type in which the demonstration of mental loss by such mathematical means as the Binet scale and its descendants is possible. The thrill afforded the psychologist in finding the mental age of a child to have fallen so many points after influenza can never be equaled in a cold, critical psychiatric study of conduct or affect before and after.

Case 1 fits well into this group, although, of course, as usual, there was an associated disturbance of conduct and emotional balance. This case is reprinted with abridgment from my expository analysis of the postinfluenzal mental cases, where it was given to illustrate the hypophrenic group.20

**Case 1.**—Abstract.—A lad, aged 10, of American parentage, previously very dull in school, but well enough behaved, after an attack of influenza became much disturbed and was brought to the hospital for care. When his excitement subsided it was found that his intellectual level had apparently fallen even lower than before. The diagnosis, on admission, was low grade moron; on discharge, high grade imbecile. The effect of influenza was aggravation of the hypophrenia, all spheres, but particularly the intellectual.

History.—The family history was entirely negative. An only brother, a year younger, was quite well and was doing fair work in the fifth grade. The patient had so far had the very lowest rank given, and was repeating the work, and then, though it was still poor, he was promoted. His work in the second grade was poor, but he was promoted because of a desire not to keep backward children behind indefinitely. He had always been quiet and rather seclusive, and played with childish toys which even the younger brother had outgrown. His teacher reported
that his deportment was good, and that he did not seem sensitive about his backwardness. There had never been any conduct disorder of note.

**Present Illness.**—He had had influenza for four days; the temperature was not known. He had "slept without waking" for three days, taking no food. The physician and the nurse insisted on his staying in bed a week, which he did without complaint. He was "perfectly normal and happy" up to this time. Three weeks after the influenza (on Christmas morning) he complained of headache and fatigue, and according to his parents' statement "had been out of his head since." (The history was obtained on the 28th.) He cried constantly; wandered about aimlessly; went outdoors and became lost; occasionally sang in a feeble voice numerous popular songs; at other times screamed and cried and refused to remain in bed; said, "I'm lost; take me home; I will be good to you." His parents were alarmed because he failed to recognize his mother. He was brought to the outpatient department and recommended to the house.

**Mental Examination.**—For the first two days, he blubbered and wailed constantly, the more so when any attempt was made to comfort or quiet him. He selected one of the nurses finally, whose attentions he would permit, and dragged himself about the ward at her heels thereafter, crying when anyone else approached him. He was sleepless for the greater part of the first four nights, but gradually slept better at night and cried less in the daytime, until on the fifth day he was quiet all day, clothed, accessible and in a faint way cooperative. Orientation for place, time and person was retained from the start. His memory defect was most prominently shown in school learning. He was tested by the tests used at the Waverly School for the Feebleminded and found incapable of doing any of the third grade tests, many of the second grade tests, and not a few of the first grade requirements. There were no amnesic periods, no delusions or hallucinations, and no defect of attention after the fourth day. The associations were rather slow but not schizophrenic, incoherent or erratic, although, of course, quite puerile. Emotional tone was, of course, in question. During the examination he made no display of emotion except at the mention of home, which evoked a few quiet tears, and on the day of discharge he was quite elated and happy because he was going home. His conduct disorder was confined to the wailing and screaming of the first few days.

**Subsequent History.**—On the day of discharge, January 4, his lugubriousness was replaced by smiles and complacency.

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His memory was again tested briefly and found impaired, even for the recent episodes; insight was essentially lacking, although he did say that his head was "not right" and that he had been dizzy from rocking too much; the intellectual processes were definitely but slightly improved; ideation was as before, and conduct was above reproach. He took no interest in trying to do ward work and gave no other manifestations of normal initiative.

**Physical Examination.**—He was a rather undersized lad, whose physical examination was negative in all respects.

**Laboratory Findings.**—The urine was negative. The blood serum Wassermann test and spinal fluid tests, including the Wassermann and Lange tests, were all negative.

**Psychometric Tests.**—The patient graded regularly, with a variation total of 7, at a mental age of 5.7 on the Yerkes Bridges point scale. On the Stanford scale, four days later, he graded at 6 years, 2 months. In the supplementary tests his performance in the construction puzzles was poor. The memory tests were also poorly done, and he accepted ten out of ten suggestions. The patient cooperated poorly on the point scale and fairly well on the Stanford.

**Final Diagnosis.**—He was discharged with recommendation for instruction in a school for the feebleminded. The diagnosis at discharge was imbecility.

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GROUP 2. WITH EMOTIONAL DISTURBANCES

Cases 2 and 3 are illustrative of predominant dysthymic manifestations of hypophrenia as aggravated by influenza.

**Case 2.**—Abstract.—A negro lad, aged 16, who, although always regarded as peculiar, had never been troublesome or disagreeable, after an attack of influenza became so inexplicably irritable, sullen and irresponsible that his father took him to court as a "stubborn child that hasn't good sense," to "have his mentality taken." The diagnosis was hypophrenia, low grade moron. The effect of influenza was distinct aggravation, particularly of emotional disturbances.

**History.**—The mother was an epileptic, who had had influenza in September and presumably in her delirium, had jumped from the roof of her house, killing herself. The father seemed to be above the average negro, and had had a university education. There was no history of any nervous or mental trouble among the six siblings. The patient was born in Boston and had attended kindergarten at the age of 5. He left the fourth grade at the age of 16, after having been held back in every grade. At the age of 5 or 6, he was "vaccinated" for diphtheria during an epidemic, but contracted the disease nevertheless, and "had never been the same since." He was always regarded as peculiar, even by his parents. He seemed to have been a sociable lad and was fond of going to parties.
and dances. He wandered about a good deal and could not succeed in keeping any job more than a few weeks. Apparently he worked well, but objected to having his father take his wages ($9). However, until the present illness he had never been in trouble of any kind, nor was there any record that he was ever suspected of being feebleminded or insane. Obviously cheerful and agreeable he was most of the time, sullen, morose and irritable. He took to sitting alone in the dark for hours, idle and abstracted. The father finally, in desperation, took him to the police station and swore out a warrant against him as a stubborn child. He affirmed in court that the boy "hadn't good sense." It was from this court that the boy was sent to the hospital for examination.

Examinations.—Mental: The mental examination confirmed very well the father's report of the child's emotional disturbances and his volitional and intellectual deficiency. He was at first not at all cooperative or attentive, and was sullen, restless and ill at ease. Later he became more cooperative and accessible, and talked pleasantly in the ward. He became quite panic-stricken on contemplation of the rumored lumbar puncture. Later he was somewhat obstreperous about being confined in the hospital. His attention was never very good, and his thought processes showed a general scattering and weak associations. His thought content showed a paucity and inadequacy in the ideational realm, but there were no delusions, obsessions or phobias. There were no hallucinations in any sphere. His orientation was only approximate; his memory for remote events was quite poor and for recent events quite inaccurate. He had very little or no insight, although he said, "They claim I am wrong in my head."

Psychologic: "The patient graded irregularly with a variation of 17 at a mental age of 8.7. In the supplementary tests, he did very well in the memory test. Nine out of ten suggestions were accepted. He cooperated well."

Physical: Thorough physical and neurologic examinations were entirely negative. The blood pressure was: systolic, 118; diastolic, 70. He was 5 feet, 2½ inches tall, and weighed 120 pounds.

Laboratory: Examinations of urine, blood and spinal fluid were entirely negative.

Case 3.—Abstract.—A teamster, aged 29, apparently a typical moron, without previous episodes of emotional or conduct disturbance, after influenza, diagnosed at a base hospital, became disinterested in life and melancholy to the point of attempted suicide. The diagnosis was hypochondria (moron grade) with depression. The effect of influenza was aggravation, particularly of the dysthymic symptoms.

History.—The family history, which was obtained in detail, was entirely negative, including an account of the parents and of the paternal and maternal siblings. The parents were as ignorant as the average Irish immigrants, but the six siblings were all progressive and self-supporting. The father was described as being sociable, good natured, but quick tempered, and nonalcoholic; the mother as having a quiet, friendly, even disposition. Both parents and siblings were well, and the only death in the family was that of a year old brother. The patient was born in a Boston suburb, where he started to the parochial school at the age of 5, and after 10 years achieved only the fourth or possibly the fifth grade. The reason for his leaving may have been his failure to progress, although the brother, who seemed to be a man of some intelligence, ascribed it to extraneous conditions, poor teachers, insufficient books, etc. No conduct disorder was alleged. After leaving school, he served as errand boy for a grocery (at $9 a week) for a few years, became a teamster, and had remained at that work more or less continuously since. It was hard for him to hold a job very long. For a year and a half before being drafted, he worked for an ice company at $3.25 and two meals a day. He started drinking when about 17, and had kept it up steadily since, periodically and distinctly to excess. He had been arrested repeatedly for drunkenness. He smoked more than twenty cigarettes a day. He had never been married, and denied excessive sexual irregularities and venereal disease. He was regarded by his family as "spendthrift." The brother and father said: "He has a quiet, good-natured disposition, and has many friends. He is naturally lazy and inclined to be selfish. He likes to go to movies and theaters, and read newspapers. He has never been considered as nervous in disposition, but is rather staid and serious."

Present Illness.—The patient, for some unknown reason, steadfastly denied having had influenza or any other illness. Nevertheless, the facts seem to be that about six or seven weeks before admission to our hospital, he was in an Army base hospital with the ubiquitous influenza, so diagnosed, where he remained for twelve days. Shortly after his recovery he was discharged, physically well, because of the demobilization. He had seemed to his relatives, with whom he lived, to be unusually quiet, ambitionless and depressed. "He kept saying he would like to be in the good condition he was in before going into the army. He was sad, could not
work, . . . tried it one day, but felt too weak." Apparently his depression increased, and on the day before admission he attempted suicide by turning on the gas. He stated afterward that this was a subterfuge of his own device to gain admission to the hospital (1). He was taken to the police station, revived, and advised to go to the psychopathic hospital by the physician called. This he willingly did.

The mental examination confirmed the diagnosis suggested by the history. The psychometric age was 9.3. He recognized his own mental inferiority. There were, in addition to the usual shallowness of thought processes, the paucity of ideas, puerility of judgment, etc., of hypophrenia, and symptoms of depression with retardation of thought and movement.

The physical examination and laboratory findings were negative.

The emotional disturbances which the influenza seems to have provoked in these cases are perhaps analogous to the psychic discomfiture, the depression, irritability, languor, and sometimes mild agitation or melancholy which is so often seen in (supposedly) normal persons after an attack of influenza. I have previously pointed out (21) that, whereas these depressive symptoms, or a depressive tendency, are very frequent in normal persons (some say they are always present, e.g., Pritchard (22) they are comparatively infrequent in persons who develop psychoses. The observation has been disputed by Fell (23) but without sufficient substantiation by clinical data (24).

24. In the hypophrenic patients there has not been noticed any general tendency to depression following influenza. The usual cheerfulness is in most cases apparently retained. Nor have I heard from the superintendents of the institutions caring for the feebleminded that irritability, moroseness or taciturnity were increased after the epidemic. On the other hand the emotional disturbances in the hypophrenic patients whose mental state was distinctly altered by influenza in other ways is noteworthy. The striking manifestation of it in Case 3 is able evidence. Case 4 is even more pertinent, since the dysphoria is the outstanding feature. Consequently, one is led to deduce that the hypophrenic patients follow an inverse law to that applied to normal and psychotic individuals. These two principles may be thus contrasted: Most normal persons suffer emotional depression after influenza, but of those in whom the influenza precipitates a psychosis, few exhibit depression. Most hypophrenic patients do not suffer depression after influenza, but of those in whom influenza produces marked mental changes, the majority do exhibit emotional disturbance (depression or irritability, etc.).

GROUP 3. WITH CONDUCT DISTURBANCES

Conduct and volitional disorders are so constantly associated with intellectual lack in hypophrenia that one might expect a postinfluenzal volitional disturbance in some hypophrenics. Such is actually the fact, and these cases are apparently the most frequent of all. Perhaps it is that these known hypophrenics whose psychomotor control becomes impaired to a noticeably greater extent are only more conspicuous than the cases of intellectual deterioration, or those emotionally disturbed. The fact of the greater ease of recognition may account in some degree for their greater frequency. At any rate, we have been able to collect the reports of several cases from the recent epidemic, one of which (from our Boston series) appears below. Three of the cases mentioned by Burr (25) would probably fall in line here.

CASE 4.—Abstract.—A white girl, aged 17, clearly subnormal, of a hypophrenic family, whose conduct disorder became so remarkable after an attack of influenza that she was brought to the psychopathic hospital for examination, was diagnosed as being hypophrenic (of subnormal grade). The effect of influenza was distinct aggravation of symptoms, particularly conduct and emotional disorders.

History.—The patient, who was born in Boston of New England parentage, had two brothers in state institutions for the feebleminded, and five other siblings were in the public schools. Her physical life had always been excellent, and there were no stigmas of nervous or epileptic disease, such as fainting attacks or enuresis. She attended school from 6 to 13, and progressed to the fifth grade. At that age she was committed to the state reformatory for girls because of her extravagant sexual promiscuity. There she remained through a stormy period of four years. She was given a place to work after her discharge from there, but lost it through a sexual exploit. A second place was secured which she voluntarily gave up because of disinclination to do the work, saying that she was engaged and did not need to work much longer.

Present Illness.—The girl had influenza late in the fall. Subsequently, she became "very ugly and irritable," charging unjust treatment, and was evidently highly exasperating (and so impressed the examining and admitting physicians at our hospital). She had talked much of her wish and hope to die, and "exposed herself again to influenza" in the hope of attaining that result. She capped the climax by sending for

the physician and then running away to a cinema before he arrived. The parole board sent her to the psychopathic hospital for examination.

Mental Examination.—The prominent features of the psychic examination were the emotional instability and the intellectual lack. She was extremely antagonistic at first, irritable, impertinent and quite inaccessible. She talked constantly, but refused to answer questions. Later she made herself quite agreeable and cooperative. Her ideation and judgments showed the typical childishness and inadequacy. Many of her statements were of questionable reliability and veracity. There was a slight paranoid coloring to her story, as is frequent with the delinquent hypophrenic sent by the parole board for examination. The psychometric test gave her a mental age of 12 years, with a variation total of 11. "The patient cooperated well (1). Her performance on the construction puzzles and on the memory tests was good. In the suggestibility test she resisted all ten of the suggestions offered!" (The latter is interesting in view of her reputed immorality, etc.). Her retention of school knowledge was very poor, indeed, except in arithmetic, in which she did only fairly well.

Physical, gynecologic and neurologic examination, and analyses of urine, blood and spinal fluid proved negative.†

COMPLICATED HYPOPHRENIA

The preceding cases of the three groups have all been examples of simple, idiopathic mental defect without psychiatric or neurologic complications. Now follow cases of hypophrenia, of mental defect to be sure, but cases in which there are neurologic or psychiatric elements that are conspicuous enough to determine their place in the list.

The importance of this factor of conspicuousness, to digress, is often overlooked for the very inconspicuousness of itself. Consider an imbecile child in an institution for the feebleminded. What, though an ambitious and hypercritical clinician establish the fact that this child's spinal fluid gives weakly positive Wassermann and gold reactions? The child continues to be regarded and treated as an imbecile; that is, as hypophrenic, although it may be technically conceded on the records that he is a neurosyphilitic imbecile (which is, of course, probably incorrect, as he would likely be an imbecilic neurosyphilitic). But, on the other hand, if the child, however hypophrenic,

devolved peripheral gummas, or if the father became notorious as a paretic, etc., there is a likelihood that enough conspicuousness might be thrown up about the little imbecile to secure for him the proper label, and thus the proper classification, and thus the proper treatment. Conspicuousness, then, may determine classification, and hence treatment.

It is astonishing to hear certain otherwise intelligent persons rail against the classifications and the attention paid to classifications, particularly in psychiatry, when for want of them patients continue to be misplaced and mistreated or not treated at all, throughout the whole country. It is safe to presume that there is no state in the Union whose penal institutions are free enough from hypophrenics, or whose feebleminded institutions are free enough from neurosyphilitics, patients with brain tumor, etc., to throw stones at this deposition. Herein lies the incalculable advantage of correct and applied classifications, and the service of Kraepelin, and more recently of Kirby,26 of Southard27 and of Orton.28 The work of Fernald, Southard and Taft in carrying on the projects of Bourneville and Hammarberg to ascertain the actual pathologic why of hypophrenia is likely to achieve great results through the machinery of a classification, and if we are to look forward to a mundus sine hypophrenia, surely this is our most promising route.

For these reasons, then, the following cases cannot justly be left in a group of "simple hypophrenia"; and in the present imperfect state of our knowledge of that affection, to say nothing of our ignorance of the complications of hypophrenia, a classification must be framed with the greatest possible generality of terms. In every instance, of course, there is a hypophrenic factor, and its precise relationship to the complications varies in each case.

The first two cases constitute a group I have labeled "Hypophrenia with Neurologic Manifestations Prominent." Neurologic symptoms being conspicuous, these patients would be suspected of being encephalopathic

† The case of improvement of uncomplicated hypophrenia given below would logically fall in this group of simple hypophrenia, but it deserves the emphasis of later consideration.

28. Orton, Samuel: Classification presented at the 1919 session of the American Medico-Psychological Association, and appearing in the transactions of that meeting.
before being suspected of being hypophrenic. As will be seen from the data presented, however, both cases make bids for both the neurologic and hypophrenic groups, for the yet tenuous group of hypophrenia on organic bases, of this sort and that sort. These two cases may be examples of feeblemindedness directly resultant from influenza.

The next four patients were regarded as unquestionably hypophrenic before they had influenza. After influenza, psychoses developed. Nor were these psychoses the familiar episodic interruptions of the otherwise placid course of the average hypophrenic's existence. They were, apparently, frank and severe psychoses. Our knowledge of the psychotic manifestations of which hypophrenics are capable is so barren that it is futile to attempt a psychiatric diagnosis of these cases.

The third group comprises two cases, not obviously but probably hypophrenic, and certainly psychopathic. I should like to avoid the use of the ambiguous and cumbersome phrase “constitutional psychopathic inferiority” and others applied to the same state, but the identity of the picture we have in mind is indisputable. The influence of influenza on these cases is equivocal. I believe that it was definite, however slight. I admit, however, that there is room for an opposing view from the selfsame data. They are offered at their face value.

GROUP 4. WITH NEUROLOGIC SYMPTOMS CONSPICUOUS

Case 5.—Abstract.—A girl, aged 4 years and 4 months, with a father and two half-brothers with notably large heads, who, although not very bright, had never been considered particularly dull, and certainly never in ill health, prior to an exceedingly light attack of influenza, subsequently developed an intention tremor and a flaccid tripalgie, incontinence, hypotonia, absent abdominal reflexes, positive Babinski reflex, neuroretinitis and a marked mental enfeeblement. A diagnosis of gross brain disease (Multiple sclerosis? Cerebral neoplasm or abscess?) was made. The influenza was apparently causative.

History.—Two aunts and two cousins had died of tuberculosis; a paternal uncle had suffered from periodic headaches. The father wore a 7½ hat, and had a massive head and body. Two other children of the same mother, but by a different father, were remarkable for their large heads. One boy, aged 9, wore the same sized hat as his foster-father, and his

14 year old sister also had a large head (these were half-siblings of the patient). There was no history of nervous or mental disease in the family. The child was born normally, at full term, and was breast fed for one year. There were no convulsions in infancy, and teething, talking, walking, etc., were not delayed. She had always been a healthy and apparently normal child. There was nothing to prove that she had been hypophrenic before the influenza. She had learned a few rhymes and was able to repeat them, even during the present illness. Her parents thought her “as bright as the other children,” and no doubt was entertained as to her or their mentality.

Present Illness.—The child had influenza in December, 1918, and remained in bed a week, although she was “not sick at all and it was like punishment to keep her in bed.” About March, the parents began to notice a “very slight trembling of the hands when she went to use them.” When they were quiet, this was absent. This tremor increased very slowly. But in April she began to be “a little wavy” and unsteady in her walk, with “not quite so firm a step as usual.” Both these symptoms increased in severity. Vomiting attacks, never projectile, but of all degrees of severity, came as the next symptom. They recurred for a time about once in ten days, but with no regularity. At this time, also, she had mild headaches, but these were never severe, nor did the child ever complain of any pain, or show symptoms of a psychosis. May and June were uneventful, save for a steady though slight increase in the symptoms described. She began to be unable to walk on rough ground, then unable to walk even in the house save by clinging to chairs, etc., and finally not at all. But the arms, meanwhile, got no worse after June, “and may be a little better.” (With Dr. Lindsay, I saw the child in September.) The intention tremor remained very noticeable, so that she spilled water and food in her lap when she ate, etc.

During July and August there was little further change, except incontinence of urine and feces. She became entirely bedridden, but gained, weight, vomited much less frequently, and rarely complained of headache and then only casually.

Examination.—Several factors interfered with the examination, but the chief findings are recorded: The child lay on the examining table, smiled occasionally, answered no questions, and was distinctly apathetic, torpid and dull. A psychometric test was, of course, impracticable, but she would surely have rated no higher than 2 years.

Physically she was without defect, being excellently developed and nourished, the heart and lungs being normal, etc. The only abnormalities were those noted in the neurologic examination.
The neurologic examination revealed a very large head (the parents insisted no larger than always, and no larger than her half-brother's), with Macewen's percussion sign very marked (according to Leftwich,29 Oppenheim and others an indication of massive intracranial disease); pupils reacting promptly but insufficiently to light; absent abdominal reflexes; bilateral Babinski reflex; occasionally elicited Oppenheim and Shaffer signs; a very marked hypotonia, and an angry retina with normal sized vessels but with curious disks which appeared to be in a state of postneuritic atrophy. In addition, there was an intention tremor of the left arm which was unmistakable; the right arm could be used with good direction but with little force, and both legs could be guided, but could not sustain weight.

Examination of the blood and spinal fluid, and of the urine, all proved wholly negative. Six Wassermann tests on the spinal fluid were negative. The cell count was 1; the globulin test was not reported.

A roentgen-ray examination disclosed a large but vague shadow located centrally in the brain, and marked evidences of pressure. (The spinal fluid was not under pressure at time of withdrawal.) Whether or not the roentgen ray confirmed the diagnosis of tumor or of internal hydrocephalus was equivocal.

The diagnoses of cerebral neoplasm or abscess, and multiple sclerosis are both supported by some of the findings and contradicted by others. The fact of the presence of marked mental impairment was obvious, and for that reason the case was included here.

Case 6.—History (from a letter by Dr. O. S. Hubbard).—
"Baby C. was seen in consultation. Eleven months old. Heredity, siblings and past history negative. History of enlargement of head since attack of influenza. Rather poorly nourished, with a leaking heart, and a well marked hydrocephalus. The child had the characteristic enlargement of the head with the large area between and above the eyes. The child seemed considerably reduced mentally, and was afraid of strangers, could not use its body much, and appeared to be in pain when moved."

"The doctor who referred the case did not attend the child during the influenza, but the family was suffering from the disease when the child became sick and there is no good reason for doubting the nature of the original sickness. The child has not been well from that time, and my last report is that the head is probably getting larger."

GROUP S. WITH PSYCHOSES

Psychotic episodes in the course of feeblemindedness are so familiar and so frequently observed that it is rather remarkable that this should be a matter so little investigated or understood. It is not even a matter of knowledge, for example, whether or not an imbecile is capable (with or without a psychosis) of hallucinating. (I am indebted to Dr. E. E. Southard for this suggestion.) It is far from established what general form the psychoses with hypophrenic take, or what their nature or tendency. In fact, one thing alone seems to be established, namely, that psychotic manifestations in hypophrenics are usually episodic and transitory.

The precipitating causes of even these episodic displays are little enough understood. It seems likely that both physical and psychic factors may act. Thus "Zip," a notorious case described (with necropsy) by Fernand, Southard and Taft,24 died during what appears to have been a psychotic episode precipitated by psychic pain (chagrin, anger, etc.). As for physical (or should we, after R. C. Cabot,20 utilize the word exophysical?) causation, the following cases are apropos.

Case 7 was to have been an elaboration of the case reported by Burr:25 A communication from Dr. Burr, just before mailing this manuscript, informs me that further data are not available. I quote from his article, just cited: "A girl 14 years old, who had been simply feebleminded, became violently delirious during the fever, hallucinatory and delusional later, and finally had to be sent to an institution, where she now, three months later, remains. She is dirty, destructive, foul-mouthed—a complete imbecile." (It is not altogether clear what Dr. Burr means by the adjective “complete” in the last sentence.)

Harris and Corcoran,31 in a recent article dealing with psychoses following influenza in fifty cases, report one instance of a psychosis in a hypophrenic. The case as summarized in the original article is quoted verbatim (Case 8):

The patient was a moron, of approximately 8 years' mental development, although the chronological age was 43. In this case no unfavorable heredity was established, but there was defective make-up. There were no previous attacks. The onset of the psychosis occurred in the height of the physical illness. The psychosis terminated in recovery. This case is rather remarkable that this should be a matter so little investigated or understood. It is not even a matter of knowledge, for example, whether or not an imbecile is capable (with or without a psychosis) of hallucinating. (I am indebted to Dr. E. E. Southard for this suggestion.) It is far from established what general form the psychoses with hypophrenic take, or what their nature or tendency. In fact, one thing alone seems to be established, namely, that psychotic manifestations in hypophrenics are usually episodic and transitory.

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was mentally defective from childhood and incapable of progress. She had convulsions in early childhood, but they ceased at the age of 17. She always remained at home with her parents and was incapable of retaining or making use of what little knowledge she could acquire. She assisted in an inefficient way at housework in her home. She contracted influenza, which was complicated by pneumonia, and was sent to a general hospital, where she remained sixteen days. While there she became noisy, obscene, profane, irritable and assaultive. Commitment followed. Her irritability was directed toward her mother, of whom she was previously fond. She threatened to kill her mother with a knife; attacked her sister's children; walked about the house calling out names and constantly found fault with home conditions. Hallucinations were not demonstrated. [Sic, vide supra]. She appeared oriented at all times, and there was no amnesia or clouding of consciousness. She recovered from this episode and returned to her home. It might be well to note that the mental symptoms developed during the height of the patient's physical illness, yet they were not characteristic of a somatic psychosis.

Waterman and Folsom 32 mention, without any comment or detail, that “of the twenty-three male influenza cases, one [was diagnosed] as psychosis with mental deficiency [and one as] psychosis with constitutional psychopathic inferiority.” 33

**GROUP 6 WITH PSYCHOPATHY**

Whatever the final decision as to the limits and constituents of the notorious “constitutional psychopathic state” et al., no one will gainsay that there is at least a very plausible resemblance, if not relation, between certain features of psychopathy and of hypophrenia. For this reason I make no further apology for introducing the following cases at this point. 34

**CASE 9.—Abstract.—A girl, aged 13, who, without manifesting pronounced intellectual lack, had always been troublesome, untrustworthy and dishonest in the home, after an attack of influenza had a number of “fainting attacks” of dubious nature, and her conduct became more incorrigible than ever. The diagnosis was psychopathy in a (probable) hypophrenic. The effect of the influenza was possibly aggravation; the data were insufficient.**

History.—This child had been observed in the outpatient department of the Boston Psychopathic Hospital. Very little data of family and past history were obtained. She was known to have stolen money from her parents since the age of 6, and to have been increasingly incorrigible. The mother’s story was that the child had had influenza in the fall, and since that time had suffered dizzy spells. In some of these she fell, and in some of them she was unconscious for at least fifteen minutes. She was “unruly and uncontrollable at home, steals and lies.”

Examination.—A mental examination at the hospital revealed the fact that she was “quite incapable of discriminating between right and wrong.” Yet she admitted that stealing was wrong, but could not say why she had stolen except that she did it “on impulse” (the examiner’s phrase). She thought she controlled her temper quite well. She professed to like Dickens, and expressed a fondness for “detective stories and newspapers.” The examiner (who was more Freudian than psychiatrist) satisfied himself that no “sexual complex is present,” but unfortunately neglected to secure a psychometric test.

Physical, neurologic and laboratory examinations were negative.

CASE 10.—Abstract.—A French-Canadian girl, aged 15, with a long history of profanity and immorality, but with a courteous and cooperative manner, since an attack of influenza had complained of feeling weak. Her maladjustments to her human environment may also have been somewhat greater since that time. The diagnosis was hypophrenia, with psychopathic elements prominent. The effect of the influenza was possibly slight aggravation, but data were insufficient.

History.—This girl presented quite a different picture, at first, from the usual hypophrenic delinquent. She was quiet, courteous, accessible and cooperative, and made a good impression. The immediate charge for bringing her to the psychopathic hospital was alleged neglect of her baby, a charge which she explained away deftly, but not adequately, without decrying or vilifying her parole officer or employer, neither of whom, however, she seems to have cared for. On the other hand, the girl came to the hospital with a long, black history of “breaking all the conventions of society since her ninth year,” including the maltreatment of an illegitimate child, threats of infanticide, unsatisfactory service, and “is probably hypophrenic” [sic].

Her family history was what one might expect. The father was a garbage collector and the mother was separated from him. Her past history, in point of physical development and health, was quite negative. Of schooling she had little; she repeated the second grade, left at the fourth, and had little or
none in the reformatory where she was sent for sexual transgressions, because of her confinement.

In October, while employed at housework, she was ill with influenza for two weeks, her temperature reaching 102. Since that time she had complained of being weak, and seemed to have increasing difficulty of adjustment with employers and parole officer. There were, however, no definite recorded data on this point.

Examination.—As to hypochondria, however, there was no doubt whatever. Her retention of school knowledge was almost nil. She declared that “the United States entered the war, Nov. 11, 1918,” and gave as the allies of Germany, “Australia is one, and the Dutch was in it.” The Mississippi and the Charles were given as representative oceans, the change from a $2 bill after a 32 cent purchase as 69 cents. She did, however, give correctly the dates of the Civil War. Her psychometric rating was 9.8 years, with a variation total of only 8. “She did the puzzles fairly well and showed good learning ability. She did the memory tests fairly well. She accepted all of the ten suggestions in the suggestibility tests. She cooperated well.”

Mental examination revealed her chief lack to be in the intellectual sphere. Physical, neurologic, gynecologic and laboratory examinations (including spinal fluid) proved entirely negative.

IMPROVEMENT OF HYPOPHRENIA AFTER INFLUENZA

To these cases of hypochondria aggravated by influenza, I append now a most remarkable case of amelioration by influenza. This was the symptomatic improvement of a severe grade of feeblemindedness immediately following an attack of influenza. I saw this child at the Massachusetts School for the Feebleminded at Waverley, and I am indebted to Dr. W. E. Fernald, whose name has made the name of Waverley mean so much in American neuropsychiatry, for his kindness in furnishing me with an abstract of the history of this case.

Speaking for the moment of the generic process of amelioration ex nescitudo as exemplified by influenza and neuropsychiatric cases, I may mention the recently reported cases of recovery of (presumably) schizophrenia by Henry Damaye. Improvement in the manifestations of epilepsy are on record, and I am elsewhere presenting some cases in detail in the course of a general article concerning influenza and epilepsy.

But as for simple hypochondria, the case here presented is, I believe, the first recorded instance.

CASE 11.—Abstract.—Dorothy, aged 6, the daughter of college bred parents, whose maternal grandfather and his four brothers all had had “nervous breakdowns,” who had a brother and a sister, the former very “nervous,” the latter normal, was born with difficulty and had had a stormy infancy with pneumonia at 10 months, delayed dentition, etc. She had never learned to talk or to control her excreta. She had learned to walk after 3 years.

She was admitted to Waverley when 4 years old. Physically, she was practically normal. “She sits and gazes at the end of a colored stick, waving it back and forth. She gazes fixedly at the ceiling. Screams violently if crossed in her play.” The psychometric test rating was 10 months (Stanford-Binet).

In October, 1918, at the age of 5, she was taken ill with influenza, followed by bronchopneumonia, and this by empyema. During the long convalescence, she began to show marked signs of mental awakening; she began to talk and to be tidy, learned to feed herself, learned the letters of the alphabet, attended kindergarten and cooperated with teacher and physicians. The Binet test rating in April, seven months after the influenza, etc., was 2 years and 4 months. In January, 1920, it was 3 years and 10 months, an improvement of 450 per cent, thus measured! And she continues to gain.

DETAILS OF CASE

Synopsis of Findings at Admission.—The patient was the third of three children; the first a boy, who had had periodic vomiting from 2 to 7 years and who was very nervous and irritable, but was improving; the second, a bright, active and normal girl. The father was a clergyman, and the mother was a college graduate (the mother’s father was extremely nervous, he and his four brothers all had had nervous prostration and depression), was born in September, 1913. She was breast fed until 6 months old. The birth was difficult, the child being taken manually; there was malposition of the placenta, rapid dilatation of the cervix with version and forcible manual pressure on the after-coming head. The patient had had pneumonia at 10 months, and at 2 years she suffered from vomiting and diarrhea without apparent cause. At 3 or 4 months she rolled her head. Her teeth began coming at 15 months (the other siblings had had teeth late, at 16 and 13 months). During an illness at 1½ years, her spine had been rigid. The illness at 10 months had also been called tuberculous meningitis. She began to walk a little after 3 years; she did not talk and was untidy both day and night.

Physical Examination.—The child was rather attractive looking, with a vacant stare, and she cried loudly whenever

touched. The sight and hearing were apparently normal; the skin was smooth and clear. The feet were cold; the muscular development poor. She walked well. On the back of the left of the spine, there was a scar which looked like an old abscess scar.

Feb. 17, 1916, at the Waverley outpatient clinic, her mentality was rated at from 6 to 8 months. She reached and grasped things. She liked colored balls. She knocked blocks together and seemed to like noise. She did not walk, but pulled herself around rapidly. She had some minutes when she seemed to attend intelligently. She waved her hands or objects in front of her eyes.

Aug. 31, 1917: On the admission examination by the Goddard-Binet test she scored 1. She would not obey a simple command and would not take either candy or wood but screamed if they were brought near to her. She tested 10 months by the Stanford-Binet. She cried in the weak tones of a small baby when I took her from the hospital and brought her to the laboratory, and she again cried when I took her back. She could walk, but would only sit on the floor and play with colored sticks. There was something about her behavior which seemed really uncanny. She would wave the colored sticks back and forth slowly and watch the end of the stick; then she would pose with one end of the stick resting on the floor. At other times she would sit with the head thrown back looking fixedly at the ceiling and could not be made to change her attitude when called or when moved unless one attempted to remove one of her toys. She would do none of the tests which required the slightest amount of cooperation. If not allowed to have her own way, she would scream violently and hit at some one or at herself. Even an imperative tone in one's voice would help to bring on such a spell. She seemed to be a miniature reproduction of adult psychosis which had reached the idiotic stage.

History Since Admission.—Oct. 3, 1918, the patient was taken ill with influenza. Bronchial pneumonia developed a few days later. The temperature increased to 105 F, for several days. This was followed by empyema. The pleural cavity was drained, and a long convalescence followed. During this convalescence, marked symptoms of mental awakening were noted. She began to call the nurses and physicians by name. She distinguished between two picture books, a "Dolly Book" and a "Topsy Book," and asked for the one she wanted. She made a few associations; for example, a nurse whose glasses attracted her, she called "Kelly-glasses." A nurse who had given her some bright hair pins she referred to as "kitchen hair pins." There was a large rabbit on one of the pianos, so each time she heard music she would say "bunny-piano." From this time on, she improved rapidly.

Her automatic movements disappeared. She learned to feed herself. She became tidy in her habits, never wet or soiled her clothing, talked in sentences, knew all the letters of the alphabet by sight, buttoned her clothing, and could say her prayers, "Now I lay me," etc. She memorized short rymes, such as "Mary Had a Little Lamb," and played like a child of 3 or 4 years of age, feeding her doll, dressing and undressing it and putting it to bed, etc. She attended kindergarten and played most of the kindergarten games.

April 16, 1919: The mental age of the patient by the Stanford test was 2. She pointed to her eyes, nose, mouth and hair, named key, watch and pencil. She was very distractible, but was interested for a short period. She learned rather quickly, put knobbed pegs in holes, and on the Wimmer cylinder test she improved her method and reduced the number of errors. Exact counts were not taken until about the third trial, as she was playing with these materials while other children were being tested. When observed more closely on the third trial, she put in cylinders with increasing diameters, and those with equal diameters and increasing lengths with as many errors as correct moves, correcting her own errors easily. She sorted three colors of pegs when watched and when her attention was called to error ("No"). She made many errors when not corrected. Her attention wandered. After being corrected she would place the next two colors correctly.

Jan. 18, 1920: The mental age according to the Stanford-Binet test was 3 years, 10 months.

SUMMARY

This study has aimed to demonstrate the pragmatic principle of studying effects. Instead of learning of effects by studying causes, the pragmatist would learn of causes by studying effects. Hence the fruitful yield of neuropathology which, although studied as effects, has taught us much of causes. Similarly, the study of the effects of influenza may teach us something of the cause of hypophrenia.

The effects of influenza on hypophrenia as presented above may be regarded from a clinical standpoint, in the form presented. Thus, there are cases of hypophrenia aggravated in particular respect to emotional symptoms, to intellectual defects, to volitional disorders; there are further cases illustrative of neurologic, psychopathic and encephalopathic complications (if, indeed, we may regard these as complications).

But studying the problem more abstractly, one may group these effects according to the type of phenome-
non, according to the generic process represented. Previous studies have shown that the psychoses subsequent to influenza illustrate in general three processes. These are the processes of creation, precipitation and aggravation. To these there should be added a fourth, the process of amelioration. I think the phenomena observed in connection with hypophrenia and influenza as illustrated above can be similarly grouped.

The process of creation is not conclusively demonstrated. I have illustrated it imperfectly with two cases, the gross brain lesion and the hydrocephalus developing subsequent to influenza. I do not include here the secondary mental loss accompanying the "dementing" psychoses subsequent to influenza, although it is not at all axiomatic that these de-mentias are inherently different from the a-mentias of simple hypophrenia. Nevertheless, this point is waived for the time being.

The process of precipitation is by the very nature of hypophrenia difficult of demonstration. One can conceive of a case of avowed mental incompetence, whose frank defectiveness appeared suddenly only after influenza. But such cases have not been reported, or observed by myself.

But the process of aggravation, the intensification or augmentation of the symptoms of hypophrenia, is very well illustrated by the majority of the cases presented above. One might conclude from this small series of cases, which, small as it is, represents perhaps the largest collection of cases dealing with this feature of somatic-psychiatric interrelations, that aggravation is the chief process represented by the interaction of influenza on hypophrenia, where any effect at all is perceptible.

This is in striking contrast to the observations made in the cases of postinfluenzial psychoses. Here it was found that creation and precipitation were the processes primarily represented, and augmentation was comparatively infrequent. To be sure, I did not carry on as extensive an inquiry by questionnaires as to the effects of influenza on patients already psychotic; but this feature of the study was not entirely neglected, and as far as carried it yielded negative results.

Finally, the process of amelioration can be included, as illustrated by one very remarkable case. Amelioration of mental affliction ex nascenda, i.e., by injurious agents, is, as I have said, not confined to influenza as an agent or hypophrenia as material; but whatever its mechanism, it is unfortunately extremely rare. Some day it may suggest some new line of attack which will yield rich fruit.

CONCLUSIONS

1. The awakened interest in the study of the effects of hypophrenia (feeblemindedness), together with the advances made in neuropathology, have put us in a receptive attitude toward the theories of exophysical causation of feeblemindedness, and have stimulated constructive research.

2. The pragmatic value of studying effects rather than causes was overlooked by the older writers, who, taking for the most part the standpoint that hypophrenics are "born, not made," persist in it inflexibly in spite of clinical evidence and statistics which would indicate the importance of the effects of infections and the possible infectious causes of feeblemindedness.

3. Influenza as a type of acute infection, with known neurotoxic potency, gave opportunity for study of its effect in relation to hypophrenia in the recent epidemic.

4. Inquiries addressed to superintendents of state hospitals for the feebleminded afforded seventeen replies, representing more than 16,000 patients, but were almost entirely barren of important results, owing in part possibly to the burden and pressure of duties incident to the care and alleviation of the physical disease.

5. This negative evidence is offset by data from the cases of our Boston series and from private practice, illustrating effects of influenza on hypophrenia.

6. The uncomplicated cases represent: (1) hypophrenia (feeblemindedness) with aggravation of intellectual lack prominent after influenza; (2) hypophrenia with emotional sphere disturbances notably intensified after influenza; and (3) hypophrenia with volitional and conduct disorders conspicuously aggravated by
influenza; to which may be added (4) a single instance of symptomatic improvement, in all spheres but notably that of intellect, following influenza. (*Vide infra.*)

7. The complicated cases represent: (5) hypophrenia with conspicuous neurologic manifestations after influenza; (6) hypophrenia with psychotic manifestations following influenza; and (7) hypophrenia with psychopathic manifestations prominent after influenza. (These seven groups may be tersely summarized, using Southard’s terminology, as hypophrenia with hypognosia, hypophrenia with dysthymia, hypophrenia with parabulia, hypophrenia with improvement, hypophrenia with encephalopathy, hypophrenia with psychosis, and hypophrenia with psychopathy. In each case it is understood that influenza was the apparent effector.)

8. Generic processes illustrated as to the rôle of the influenza are comparable to those observed in the study of the psychoses associated with influenza, namely, creation, precipitation, aggravation and amelioration.

9. The process of creation is very imperfectly illustrated by two cases, both open to question.

10. The process of precipitation is not illustrated at all; no cases were observed, although the possibility is not inconceivable.

11. The process of aggravation, however, was comparatively frequent, and is illustrated by the majority of the cases here cited.

12. Amelioration is illustrated by one case, by courtesy of Dr. W. E. Fernald.

13. In this, then, the relation of influenza to hypophrenia differs from that of influenza to the psychoses, since aggravation in the latter was the least frequently observed phenomenon, and in the case of hypophrenia the most frequently observed.

14. From which we conclude that:

(a) The usual effect of influenza on the brain is not the production or precipitation of hypophrenia, and if it ever produces hypophrenia it is probably by means of a more or less obvious encephalopathy.

(b) On the other hand, of those already manifesting mental lack, certainly a few are influenced adversely by influenza, and the symptoms of hypophrenia aggravated, an aggravation which may be predominantly in the intellectual sphere, in the emotional sphere or in the volitional sphere.

(c) Psychoses of an indeterminate type are occasionally precipitated by influenza in the feebleminded, even as in normal persons.

(d) At least occasionally, though rarely, the effect of influenza on hypophrenia may be symptomatic amelioration.

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