ASCAP NEWSLETTER

Across-Species Comparisons And Psychiatry Newsletter
Volume 3, No. 8, 15 August 1990

"Disorders in communication have to be studied along with the psychological problems during depression."
Ellgring, 1989[1]

(c/o Russell Gardner, 1.200 Graves Building (D29), University of Texas Medical Branch, Galveston, TX 77550)[2]

For the philosophy guiding this newsletter, predicated upon combinations of top-down and bottom-up analyses, see footnote on p11[3]

Newsletter aims; 1. A free exchange of letters, notes, articles, essays or ideas in whatever brief format.
2. Elaboration of others' ideas.
3. Keeping up with productions, events, and other news.
4. Proposals for new initiatives, joint research endeavors, etc.

Responses to J Price's stimulus essay (Vol3#7) are arriving; publication starts next issue.

Notes; This issue features empirical data, for IZ a discussion of her research as she requested, and for TS ethological data. Both IZ and TS work with concepts novel in standard psychiatric research in the United States (unless one is familiar with the emphases of ASCAP!) Both take current psychiatric diagnoses seriously yet neither arbitrarily considers diagnosis the only important variable for the behavioral dimension of psychiatry and its basic science. Both accent the importance of social interactions in affective illness.

Letters: *May 28, 1990*

Perhaps through you I could tell John Pearce that his challenge has been taken up and answered in papers by Randy Nesse, Malcolm Slavin,- Alan Lloyd and myself originally presented at a conference in 1988 but now just published in the current issue of The J of the Amer Acad of Psychoanalysis.

Christopher Badcock, London

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June 29, 1990

I am sorry not to have responded earlier to your request that Dan Kriegman and I submit a piece to ASCAP illustrating our approach to integrating psychoanalysis and evolutionary biology. Although we are currently very pressed with deadlines and other commitments, I would very much like to submit something to ASCAP later on, and hope I can be in touch with you next fall concerning this. Our book, The Adaptive Design of The Human Psyche: Psychoanalysis and The New Evolutionary Biology, Guilford, should be out next spring.

For now, in a word: You are right that our approach differs somewhat from that of Chris Badcock and that we have given considerable attention to self psychology (as well as to several other less "mainstream" approaches within the broad psychoanalytic tradition). In essence, we use contemporary evolutionary theory --especially the work of Hamilton and Trivers--to develop a critical stance toward much traditional thinking within psychoanalysis.

Yet as psychoanalytic clinicians we are concerned to address the kinds of adaptive psychological phenomena that --given the crucial role of conflict,

deception and self deception in human experience--may be most clearly observable in slowly negotiated, intense, long term (therapeutic) relationships. Such clinical data are of paramount importance to us.

Increasingly, we have found that viewing the psyche as an evolved deep structure for negotiating "inclusive self-interest" (managing intrinsic motivational and attachment conflicts and regulating deception and self deception) has been fruitful in the treatment of a wide range of patients and disorders. It has also given us a useful vantage point outside of, yet related to, psychoanalysis.

I have thoroughly enjoyed ASCAP from the beginning and do hope to make a contribution in the future.
MO Slavin, Tufts, Cambridge, USA

June 25th '90

I just received the June issue of ASCAP Newsletter, which was a pleasure to read. Particularly since I haven't yet received my Apr or May issues [since moving from Switzerland] i Could you please send them on with the July issue.

Keep up the good work. With many thanks. PJ Tummon, CapeTown, S Africa

The issues are sent again. Hope you're settting in well.

Letters (continued); *July 26/90*

I'm glad you're finding the new The Imperial Animal lively. It might be interesting to readers to have some excerpts from the original itself, for a kind of historical peek at what was going on then. Students have found the connection between the old and new quite fascinating.

I enclose a note which says something about the relationship between natural and social science.

Best wishes, Lionel Tiger, Rutgers

The "enclosed note," a remarkable document, causes us to extend our most hearty congratulations!

"Dear Professor Tiger:

It gives me great pleasure to inform you that at its meeting on Friday, July 13, 1990 the Board of Governors of the Rutgers, The State University of New Jersey approved the following resolution:

WHEREAS, Dean Richard McCormick of the Faculty of Arts and Sciences - New Brunswick has nominated Professor Lionel Tiger to a Named Professorship as the Charles Darwin Professor of Anthropology; and

WHEREAS, the documentation concerning the national distinction of Professor Tiger in his discipline and the significance of the contributions of Charles Darwin clearly justify this signal academic honor;

NOW, THEREFORE, BE IT RESOLVED, that the Board of Governors of the Rutgers, The State University of New Jersey appoints Professor Lionel Tiger as the Charles Darwin Professor of Anthropology from this date.

Sincerely,
Norman H. McNatt
Secretary of the University

Discussion of essay by Irina Zhdanova (IZ) published in May ASCAP entitled "Summary of Work in Russia on Social Rank Hierarchy." by RG

These interesting and remarkable findings are closely attuned to the goals and aims of ASCAP. To highlight them, I resummarize IZ's results using my own wording. (I trust she will correct my misunderstandings.)

IZ started with the idea that self-evaluations in the social environment are disturbed in affective illness. She took the cerebral spinal fluid (CSF) from bipolar patients (depressed and manic) and studied in rats the effects of administering this *vs* control substances. Test male rats behaved in 2 social conditions:

1) "Emotional resonance" was measured by whether the male test rat (A), a stranger to the other male (B) used, would emerge from a small dark compartment (D) when B cried out as a result of electrical stimulation to B's feet. A could hear, see and smell B. Whenever A emerged from the dark into a larger lighted compartment (L), the current painful to B ceased. IZ measured time spent in either compartment and transfers between them. She found 4 strategies exhibited by the various test rats: all L (meaning A's time was spent in light with none in dark), L>D, D>L, or all D.

2) "Social hierarchy" meant that for .5 to 1 hr A was observed as he entered the cage of 3 males and 2 females, all strangers to him, but not to each other (they had been together for several days).

The rats were tested in these social situations before and after being injected with the human CSF. IZ used albino rats, but apparently switched to inbred Tryons maze-bright (Br) and maze-dull (Du) rats. These became her favorites as they showed contrasting forms of social hierarchy. Brs and Dus, originally defined from food reward-maze behaviors, showed agonic vs hedonic organization: Brs exhibited despotic hierarchies whereas the Dus exhibited low aggressivity, much motor behavior and hedonic communicative patterns. Alphas in the Du groups were harder to determine than in the Br groups. New Du hierarchies formed mostly without fights. Putting new stranger males in the cage did not result in aggressive displays to them. In mixed groups of Du/Brs, Dus usually dominated but a despotic hierarchy was not evident.

Du rats displayed all L or L>D behaviors in the emotional resonance mode, but 60-70% Brs displayed D>L behaviors. Some Brs (but never a despotic dominant) were in L>D group.

After determining behavioral portraits of the test rats, each was injected with patient CSF intraventricularly through chronic cannulae or into the cisterna magna. Control injections included saline, rat CSF, and CSF of humans without psychiatric disorder. Rats were alone for 24 hrs after injection prior to social condition experiments.

Use of psychiatric drugs in the patients caused unclear results. Therefore only results from 19 patients without drugs were analyzed. The results follow:

I. Emotional resonance: 1) Depression effects: rats spent more time in the all D or D>L; sometimes the effect lasted for 2-3 days and some rats had prolonged effects; several died after 8-10 days while others showed cyclic changes in their behavior for several weeks. The rats with prolonged effects had been in D>L or L>D groups (neither all D or all L) beforehand.

2) Manic effects: rats spent more time in all L and L>D. However, not all rats from manic injections showed the effect; indeed, some showed the "depressive effect" instead. Also if the patient had "schizoaffective" disorder, effects were confusing.

II. Social hierarchy: 1) Depressive effects were influenced by the previous social roles of participants and on the type of hierarchy. If the rat had been dominant, he became submissive and with subordinate poses. [I (RG) became confused when IZ stated that the recipient "did not attack the stranger rat" as I thought that the test animal <u>was</u> the stranger.] After 5-7 days, the recipient rat was more active, but the type of hierarchy that had been previously established determined what happened then: with a hedonic hierarchy, the recipient became dominant again but was persistantly attacked and even killed if the hierarchy had been previously despotic or agonic. [Another RG confusion involved whether, as implied by the findings, the rat was

returned to a hierarchy with which it had been already familiar.]

Injection of the CSF from depressived patients into a previously submissive rat caused it to become even less active; after 4-8 days the behavior returned to baseline.

2) Manic effects: Injection of CSF from manic patients did not change the social rank of the recipient but decreased its aggressivity; agonic hierarchies changed to hedonic ones; some despotic dominants became non-aggressive for up to 2 months.

Injections into previously submissive rats increased their activity but did not change their status in the group. None were aggressive. Baseline returned after 4-6 days.

Chemical analysis of the CSF showed that activity may be associated with small peptide molecules.

IZ states that she did not "describe all the peculiarities of these experiments (there were many). It will take a lot of space and I am not sure that it will be very interesting to you."

I feel that the details are of critical importance. Dr. Robert White, a distinguished psychiatric clinician at UTMB has a famous quote: "The devil lies in the details," eg, in my points of confusion in brackets above, the experimental protocol seems different from how the results are phrased. An animal would behave differently when the hierarchy with which he has been familiar is re-entered vs one that is completely unfamiliar. So the reader of these brief summaries of work accomplished on the other side of the world and expressed originally in another language only slowly grasps the experiment and the findings. They seem very important however, and intriguing, and worth extending and replicating.

With respect to still further details, I also find myself wondering how many of the 19 CSF samples come from depressed and how many from manic patients. How many false positives (from control injections) were there? How many false negatives were there (besides those that could be attributed to drug effects or to those that had confusing diagnoses)? Were statistics used? What was the strength of effect of the findings; what was the significance level?

Also, diagnostic issues arose. Were the diagnoses made using standardized interviews and techniques with agreed on criteria? In your country what is the difference between schizoaffective disorder and bipolar disorder? Also, in the USSR, do you distinguish a "mixed" bipolar disorder (in which both depressed and manic features simultaneously exist and indeed both may meet DSM-IV criteria)? Might this explain the "depressed result" in some manic patients?

Methodology aside, the exciting possibilities are that the agonic/hedonic distinction did not arrive anew with primates but may also exist in other mammals. How much of a basic plan is it? At what level?

Do CSF from manic and depressive persons contain components that humorally foster hedonic vs agonic mode? This is an intriguing question that we await more information on — either more details on IZ's work or fresh work by her or her imitators.

Ethological and Evolutionary View of Endogenous Depression by T Schelde

General summary: Study so far was of 9 patients (20 will have been done at study's end). Observations were made over 2-minute intervals using defined labels for behaviors. Dr Schelde carefully states his findings as hypotheses that may become final conclusions with future work:

A. The depressed patient's behavioural pattern differs clearly from his/her behavioural pattern at recovery (discharge). Reduced social

activity especially characterizes the depressed state.

B. From illness (admission) to recovery patients' nonverbal behaviour shows phasic development (short-time evolution).

C. Single developmental phases have characteristic behavioural elements, behaviour constellations, and behaviour parameters. (Fig 1 below)

Specific Hypotheses (indicated by {}) and Implications: A. Depression level. {1} Based on the behaviour parameters of diversity and activity, two depression levels can be distinguished: deep and moderate.

B. Phasic development during hospital stay. {2} With deep depression, patient behaviour during recovery changed from (a) inactivity (motoric and social) to (b) less motoric inhibition to (c) self-occupation (task) to (d) social interaction.

{3} With moderate depression, (a) moderate and sporadic motoric and social activity changed to (b) increased self-occupation to (c) increased social activity.

C. *Behavioural characteristics for all endogenously depressed patients.* {4} For both deep and moderate forms of endogenous depression, low activity and low diversity levels exist. A pool or population of nonverbal behavioural elements occur with relatively high frequencies at admission with falls in frequency or disappearance over time and improvement of the depression.

High frequency elements included: nonspecific gaze, downward gaze, closed eyes, lying down, crossed

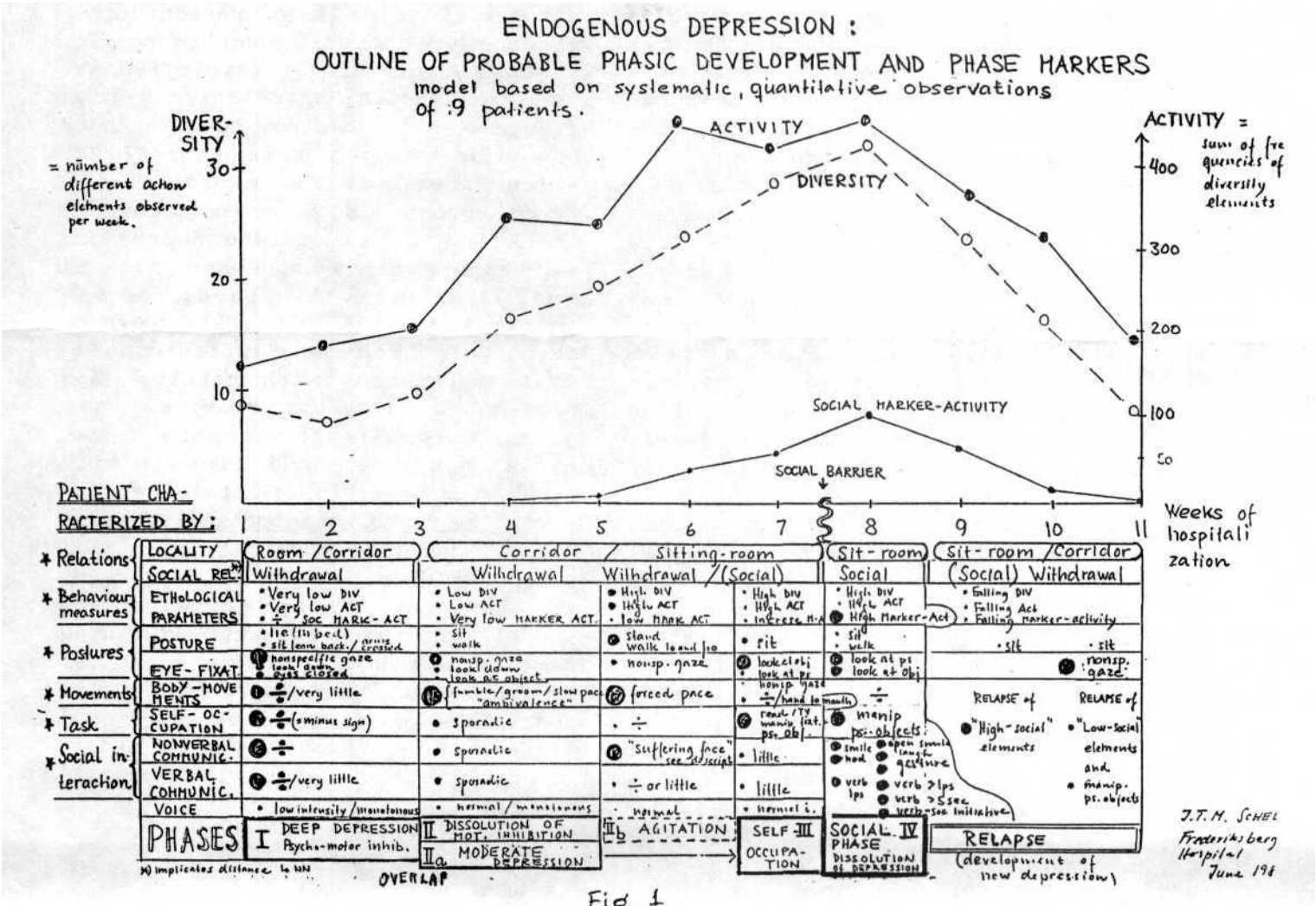


Fig 1

arms, l-3m distance to nearest neighbor (NN), >3m distance to NN, diagonal orientation of S's front in relation to NN, sleep/rest, withdrawal, fumble, receive nonverbal gestures.

Moreover, endogenous depression is generally characterized by special inactivity of the following behavioural categories: self-occupation (task), head-movements, mouth-movements, sounds (both verbal and nonverbal), receive social behavior, send social behavior (either high-social or medium-social).

{5} The deep depression is characterized by very low activity levels and very low diversity levels. That is, the activity field of the patient demonstrates very low frequencies of verbal communication (defined as receive verbal behaviour, send verbal behaviour to one person, send verbal to >1 person, send verbal 1-5 sec, send verbal >5 sec), total absence or very little occurrence of nonverbal communication (defined as facial expressions, head-movements and hand-gestures), total absence of self-occupation and occupation with others, speech --if any-- occurs with low intensity and monotony, addresses are answered low-responsively (low voice intensity and without facial expressions and other types of non-verbal communication).

Body postures, positions, and relations are characterized by the following elements with relatively high frequencies: head down, nonspecific gaze, look down, closed eyes, lie, crossed arms, sleep/rest, stay in room, corridor or sitting room, distance to NN=l-3m, distance to NN>3m, front to NN's back, S's back towards NN, social withdrawal.

{6} Moderate depression is characterized by relatively low activity levels and relatively low diversity levels along with moderate, sporadic occurrence of: social interaction, verbal communication, verbal-social initiative, occurrence to a small degree of nonverbal communication (first of all facial expressions), sporadic occurrence of self-occupation, absence of occupation with others, low/normal voice intensity, tone of voice modulated/monotonous, addresses are not answered/low responsivity. Also characterizing moderate depression are relatively high frequencies of: displacement activities of preening and grooming, fumble/fidget, and pacing (restlessly walking to and fro).

{7} Based on hypotheses 5 and 6, the characters distinguishing most between deep and moderate depression are: a. activity: very low vs moderate; b. diversity: very low vs moderate; c. verbal-social initiative: total absence vs sporadic occurrence; d. non-verbal communication: total absence vs occurrence to some degree (see below for exception); e. self-occupation: total absence vs sporadic occurrence; f. preening, grooming, fumble/fidget: low frequencies vs relatively high frequencies; g. pacing: total absence vs occurrence to some degree; h. voice intensity: low vs normal; i. tone: monotonous vs non-monotonous. Concerning d, a moderate depression may appear in a somewhat higher, specific activity level as an agitated depression with high frequencies of pacing, "suffering" facial expressions with vertical and horizontal forehead wrinkles, eyes screwed up, mouth corners backwards/downwards, and lips in/bite lips, with possibly talk to oneself.

{8} The dissolution phase. The dissolution of the motorical inhibition after the deep, stuporous depression is characterized by: growing activity, growing diversity and rising frequency of the following elements: fumble/fidget, preening/groom, walk, restless walk (pace), look at object, look around; moreover, self-occupation is observed with sporadic occurrence.

{9} Comparing hypothesis {8} with {7}, moderate depression is similar to the dissolution phase of deep depression and can be conceived as more or less identical in appearance.

{10} Moreover, hypotheses {8} and {9} hold that dissolution of motoric inhibition occurs earlier than does the dissolution of the psychic inhibition (corresponding to the ethologically defined communicative-social inhibition).

{11} Dissolution of the motoric inhibition occurs in two ways: 1. gradually and steadily with minor rises in the frequencies of preening, grooming, fumble, and pacing. Pacing is quiet. 2. Unsteadily, excitedly, and violently with conspicuous rises of the frequencies of preening, grooming, fumbling and especially pacing. Accentuated facial expressions convey the impression of "stress" and "suffering": vertical and horizontal forehead wrinkles, screwed up eyes, mouth corners backwards/downwards, lick lips/bite lips/lips in, possibly also, drag one's feet and wring one's hands. As noted on part d of {7}, this may correspond to "agitated depression."

{12} The self-occupation phase typically follows after the dissolution phase, with the following elements apparent: watch TV, read, write/draw, game (eg play cards with oneself), manipulate fixtures, manipulate personal things, tidy oneself. Probably a tendency for self-occupation to be. carried out sequentially or hierarchically, eg, this sequence over a week: manipulate fixture to read to manipulate personal things. Manipulation of personal things may express a better personal state than manipulating fixtures.

This phase is transitional to the improvement or social phase.

{13} The social phase. This phase of improvement/recovery demonstrates the same elements after both the moderate and deep depressions. These include high activity and diversity levels and by a pool/population of behavioural elements which in the recovery phase show high frequencies compared to the depressed stage. Either the elements may show markedly high frequency rises or they may only occur in this last phase as solo elements. Specifically, this pool includes the following (of which the italicized elements can be conceived as markers of improvement/recovery): *look at person, look at object,* look around, stand, sit/lean forward, arms apart, arms touch, legs open crossed, *distance to NN 0-1m,* subject's front towards NN's front, *sit sideways, manipulate personal objects,* tidy oneself, smoke, shake one's head, *nod/thrust,* raised eyebrows, wrinkled eyebrows, smile to oneself, *open smile (social),* closed smile (social), laugh (social), send verbal 0-1 sec, *send verbal 1-5 sec, send verbal >5 sec,* gesticulation, *receive verbal,* help, *send verbal to >1 ps, send verbal to 1 p,* and being socially responsive (withdrawal).

{14} A calculation of the total activity of the 12 marker elements, the marker activity, will indicate the social phase itself with great precision because the marker-activity is several times bigger in the social phase (recovery phase) than in the preceding phases (self-occupation, moderate depression/dissolution phase, deep depression). Also the fact that the marker-activity rises rather abruptly shows the start of the social/recovery phase.

{15} From the withdrawal state the patient becomes social (crosses the social barrier). In this situation/transitional state the patient may show raised frequencies of displacement activities (preen/self-groom) probably as an expression of nervousness/social stress.

D. *Hypotheses concerning relapse.*

{16} Possible relapse from the recovery phase can be recognized by a

constant fall of activity, constant fall of diversity, fairly steep fall of marker-activity, and relapse of the 12 marker-elements (and some other "high social" elements from the recovery-pool, eg, laughter, gesticulation.

{17} Relapse of marker-elements. Within marker elements representing verbal, nonverbal communication and task (occupation), the relapse will happen sequentially or hierarchically. The first elements to disappear include verbal-social initiative, tasks with others, verbal to >1 ps, verbal >5sec, and verbal 1-5 sec. The next elements to disappear are verbal to 1 p, nod, smile, manipulate personal things/objects, and the last to disappear, is to receive verbal.

At the same time, the eye fixation will gradually change from looking at ps, look at object, and look around to nonspecific gaze and look down and distances to the NN will increase.

E. *Hypothesis concerning a qualitative hierarchy in the social phase.*

{18} Based on the relapse sequence mentioned in {17}, a corresponding qualitative hierarchy can be postulated, with upper, medium and lower level elements, ie, the upper level elements correspond to the first ones to disappear and may indicate an especially favourable social-psychic state with the patient.

F. *Hypotheses regarding psychic stability at discharge.* {19} The following behavioural constellation may represent a stable psychic state at discharge: high activity, high diversity, occurrence of all 12 marker-elements, and high marker activity.

{20} However, the following behavioural constellation represents an unfavourable psychic state at discharge: very low activity, very low diversity, almost total absence of improvement markers, and very low improvement marker activity.

{21} The following behavioural constellation represents a lesser or greater degree of lability at discharge: high activity, high diversity, occurrence of some improvement markers, relatively low improvement marker activity, and relativelly high frequencies of fumble, preening/groom, and pacing.

G. *Hypotheses regarding prognosis and prediction.* {22} Prognostic of a long hospitalization (6-11 weeks) is the occurrence at admission of: very low activity levels and very low diversity levels. {23} Prognostic of a short hospitalization (4-5 weeks) is the occurrence at admission of medium low activity levels, medium low diversity levels, initiate verbal-social interactions during the first week of hospitalization and increasingly engage in social activities during the first week.

{24} In the deeply depressed patient with a strong psycho-motoric inhibition, dissolution of the motoric inhibition is predicted by rising activity values, rising diversity values along with increasing frequencies of consume, fumble, preening/groom, look around, walk and pacing.

{25} The dissolution phase itself is predictive of the self-occupation phase provided that the dissolution phase develops fairly steadily.

{26} If the dissolution phase develops unsteadily with high frequencies of pace and restlessness it may predict an agitated depression state (cf {11}).

{27} The self-occupation phase is predictive of the social phase. After a latency (duration of which is patient-specific), the patient will cross the social barrier.

{28} When this happens, the patient will use and exhibit the 12 social marker elements in social interaction with other patients and nurses.

{29} Improvement is also indicated by a conspicuous rise of the earlier mentioned marker activity.

{30} Relapse from a state of im-

provement or recovery is predicted by fall of diversity, fall of activity, relapse of markers of improvement (social markers), and steep fall of marker-activity.

The relapse occurs in sequences or hierarchically as described above in hypotheses {17} and {18}.

H. *Hypothesis concerning possible non-endogenous depression.* {31} One patient in the pilot investigation seemed to present a depression of a different character than the others. In contrast to them, she showed substantial amounts of self-occupation at admission, no development/rise in verbal communication from admission to discharge (11 weeks), no or very little development in nonverbal communication (facial expressions, head gestures, hand-gestures), and negligible frequences of fumbles and preening/grooming. In addition, from the hospitalization's onset, she showed verbal-social initiative and flexible facial expressions. In other terms, she was more/much more socially interested and socially responsive than the other patients.

I. *Hypotheses concerning the usefulness of the behaviour measures activity, diversity and marker activity and of the individual phase markers.*

{32} The behavioural measures activity and diversity seem to be able to discriminate between deep and moderate depressions by absolute values (eg, deep depressions demonstrate a diversity score of 10 but moderate depression of 20).

{33} In parallel, improvement is indicated by absolute fairly high activity and diversity values in the different patients whether or not they have had a long or short hospital stay.

{34} A rise of the social marker-activity indicates beginning improvement, a continuous rise of the social marker activity to fairly high values indicates improvement/recovery. However, in contrast to the obvious absolute values that seem general to the different patients, the marker-activity values may vary considerably among patients. (See Fig 2) Different patients socialize differentially. However, despite such variation, the social marker-activity seems to indicate with precision the onset of improvement, better than diversity and activity levels.

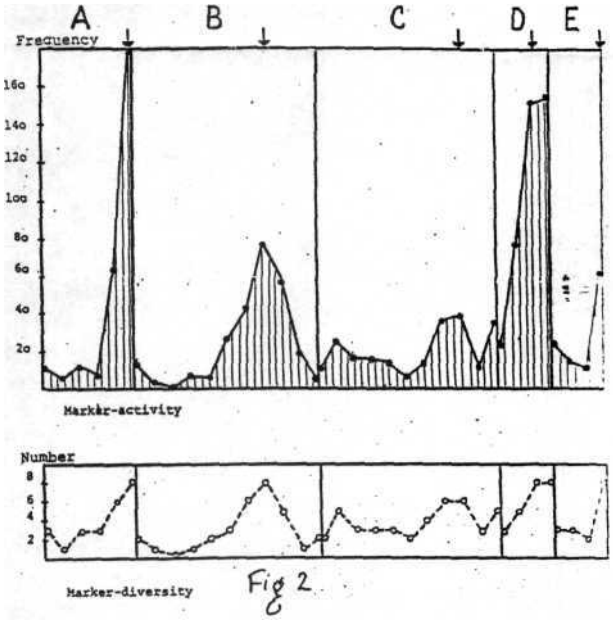
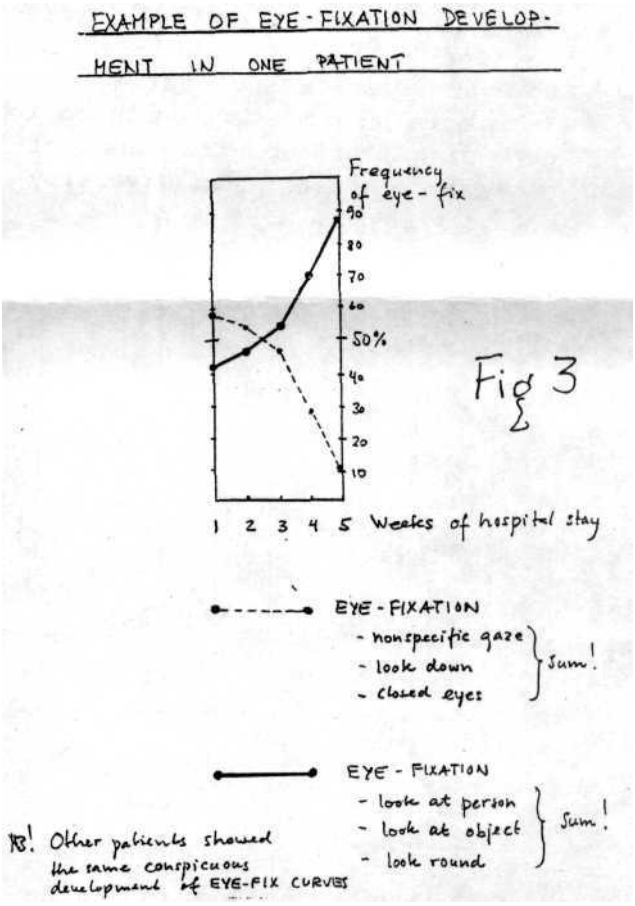


Fig 2.

{35} The advantage of using the phase marker elements is that they are directly observable (vs. diversity, activity and marker-activity which are summed only after a week's observations). Additionally, they support, compliment and qualify these quantified behavioural measures. For example, a patient shows rather high diversity and activity, but among the 12 social marker-elements, he exhibits only a few, eg, look at person/look at object, receive verbal, send verbal to 1 p, send verbal 1-5 sec. But notably the same person shows no facial expressions, head-gestures, hand-gestures, send verbal to 1 p, send verbal >5 sec. This implicates further hypothesis {18} that states there is a qualitative hierarchy among the social marker elements.

{36} Change from depression to im-

provement is accompanied by significant changes of element frequencies and these discriminate.



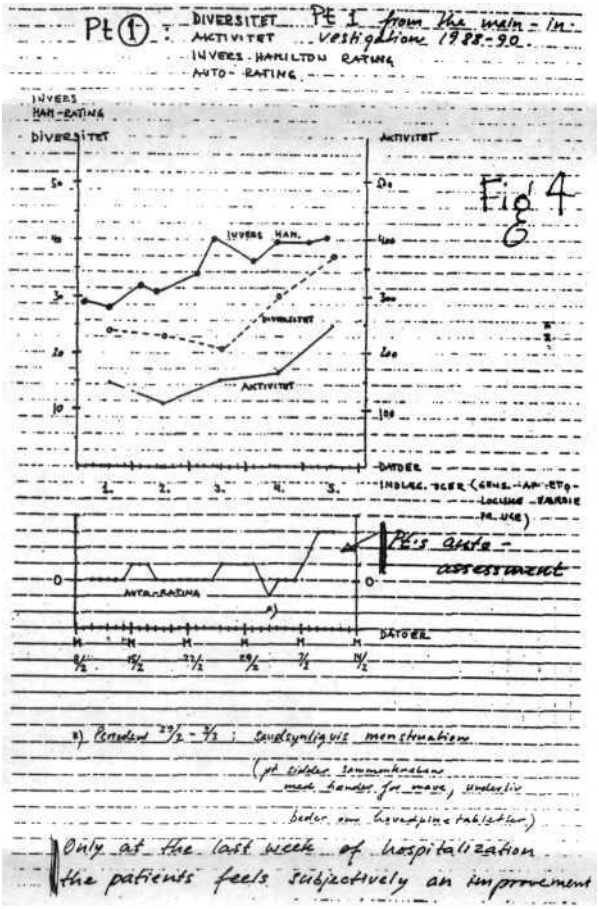
{37} Elements that "occur with depression or in the social phase (improvement) are especially discriminating. Key elements from the social phase are: open smile, laughter, gesticulation, send verbal to >1 p, send verbal > 5 sec.

J. *Hypotheses regarding the significance of eye-fixation frequencies (measures) as general indicators of depression and improvement.* (Fig 3)

To highlight points already made, the following eye related elements discriminate well between depression (italics), beginning improvement (underline) and improvement (remaining): *nonspecific gaze, look down, closed eyes,* look at object, and look at person, & look at object.

K. Hypotheses concerning patient's own feeling of improvement compared to ethological data. (Fig 4)

Patients seem able to feel improvement only when they reach the social phase. Ethological parameters and marker elements, on the other hand, show improvement/beginning improvement in early stages, as with self-occupation and dissolution of motoric inhibition, for example.



In this work, ethological data support and complement Hamilton ratings which also sometimes indicate improvement before the patient is able to feel that him or herself.

[At this point Dr. Schelde's original manuscript provides ideas about "the practical application of the above mentioned hypotheses/results." These are not replicated here because space constraints exist but can be in the future should these seem useful for readers. However, Fig 5 represents an outcome of such effort.]

1. Ellgring H (1989) Nonverbal communication in depression. NY: Cambridge U Press, p.12

2. For ASCAP Vol 3 (Jan through Dec, 1990) please send $18 (US dollars) for the 12 issues. Make checks or money orders out to "Department of Psychiatry and Behavioral Sciences, UTMB"

3. ASCAP philosophy and goal. High scientific importance rests on comparing animal behaviors across-species to understand better human behavior, knowing as we do so that evolutionary factors must be considered for understanding properly such behaviors. To accomplish these comparisons, very different new ways of viewing psychological and behavioral phenomena are required. This in turn explains why we need new words to define and illustrate new dimensions of comparisons across species. We expect that work in natural history biology combined with cellular-molecular biologic research will emerge as a comprehensive biologic basic science of psychiatry. Both top-down and bottom-up analyses are needed. Indeed, this must happen if we are to explain psychiatric illnesses as deviations from normal processes, something not possible now. Compare to pathogenesis in diseases of internal medicine.

4. In the 9 patients observed up to the time of this writing, only one in fact showed relapse; all the others ended in the social phase and were thereafter discharged.

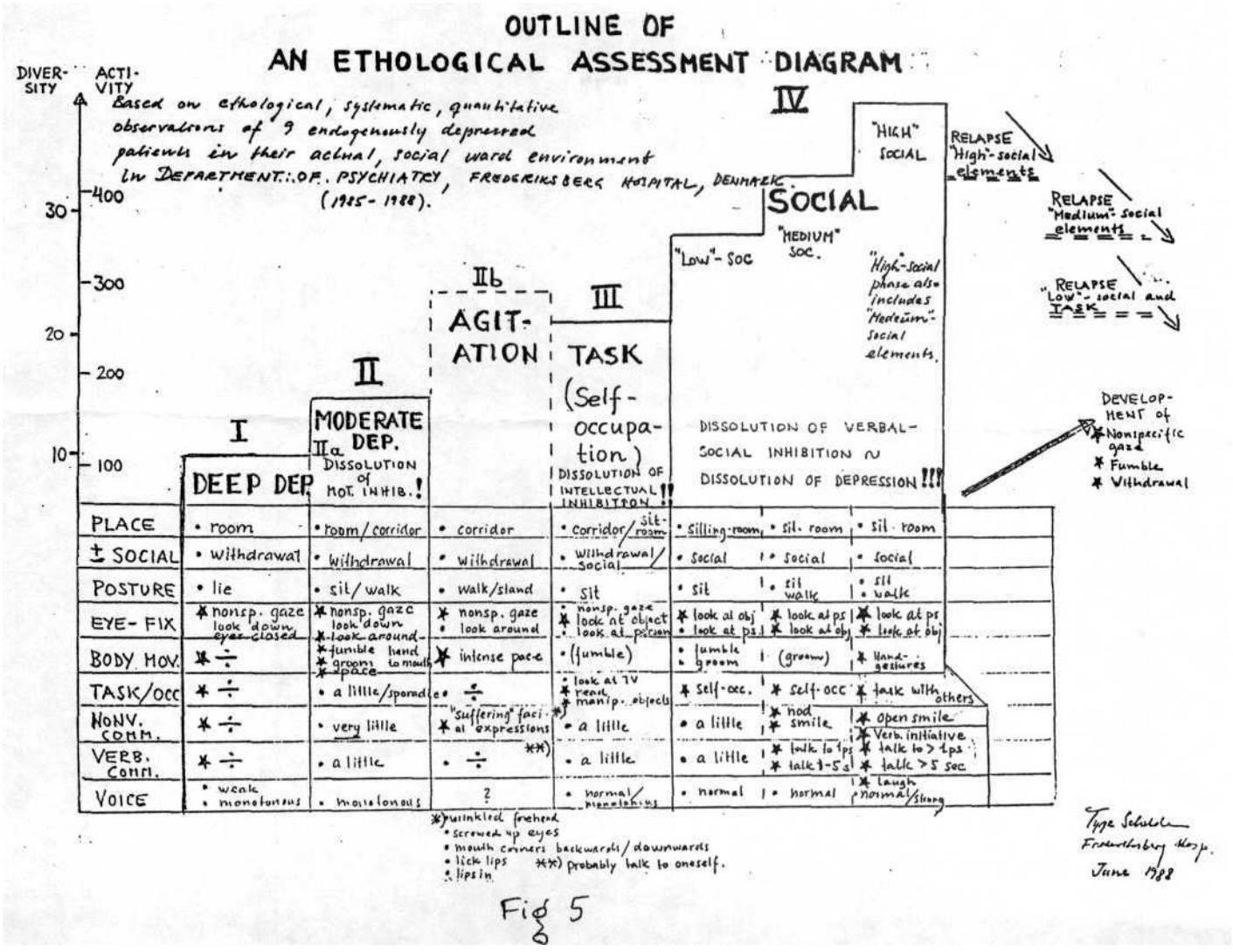


Fig 5