To what extent shall the prospective specialist be permitted to exercise his prerogative under the elective system as applied to internal medicine before graduation?

It may, perhaps, be the opinion of some medical educators that a certain given course for such students be offered as a minimum requirement, and that by this means more time be afforded for work in their chosen field or for original research. To this, however, objection is here made on the following grounds:

I. That expert practical knowledge in any specialty presupposes and demands a good working familiarity with the theory and practice of medicine, and this is not to be learned any too thoroughly in a completed system of undergraduate work.

II. That the finished work in any specialty should never be attempted in a medical school regardless of its scope or facilities, the only field for the attainment of a sufficient degree of special knowledge to justify practice being found in post-graduate work reinforced by clinical experience.

III. That the demand for original research among undergraduates is more fancied than real, the actual purpose of the student at this time being to absorb much, rather than to attempt to contribute a little.

IV. That in view of the uniformly earlier attainment of social, professional and financial success of the specialist, and greater ease of living, the law of compensation justly requires a much longer period of earnest studious preparation.

V. That the present overcrowding of the profession morally necessitates the imposition of rigid restrictions to graduation as well as to admission and the possession of the highest possible degree of proficiency in order to compete successfully with those unhandicapped by knowledge or conscience.

For these reasons there does not appear in the interests of the would-be specialists any especial necessity for the application of the elective system to this department.

It is hoped that these mere suggestions may sustain the thought that a consistent regard for the highest ultimate welfare of all students and practitioners of medicine requires that the elective system, although of great recognized value as applied to a portion of the course of instruction, yet should bear no considerable relation to the study of internal medicine in American medical colleges.

OBSERVATIONS ON THE IODINE REACTION IN CHILDREN.

BY CHARLES HUNTER DUNN, M.D., BOSTON.

THESE observations were made chiefly with the view to adding to the data already accumulated, on which the diagnostic value of the iodine reaction is based, and also with a view to determining whether the reaction in the diseases in children corresponds with that of similar conditions in the adult. For this purpose a test

was made of the iodine reaction in the blood of every child immediately upon admission into the Children's Hospital during a period of three months, and also in all cases where any fresh disease developed during the child's stay in the hospital.

The technique employed was described by Drs. Richard C. Cabot and Edwin E. Locke in an article in the *Journal of Medical Research*, 1902, Vol. vii, No. 1, and further described by Dr. Locke in the *Boston Medical and Surgical Journal* of Sept. 11, 1902.

In addition to merely noting the presence or absence of the reaction in each case, an attempt was made to estimate the per cent of leucocytes showing the reaction. The figures give percentages of the whole number of white corpuscles noted, not of the polymorphonuclear neutrophils alone. In estimating these percentages, from one hundred to four hundred leucocytes, according to the presence and amount of leucocytosis, were counted, and of these, all leucocytes showing a distinct reaction, no matter how slight, were counted in.

The reactions were further classified according to the intensities of the reaction in each individual leucocyte. In cases in which only a brownish discoloration was present the reaction was classified as slight (Sl.). In cases in which, in addition to such discoloration, distinct but small brown granules were visible in any of the corpuscles, the reaction was classified as average (Av.). In cases in which many large brownish granules were observed in any of the cells the reaction was classified as marked (M.), and where any cells were observed in which the large granules were so numerous as to coalesce in brown masses giving a deep brown color to the protoplasm, the reaction was classified as very marked (V.M.).

In addition to the single observation made on each case admitted to the hospital, in certain diseases, notably pneumonia, typhoid fever and cerebro-spinal meningitis, further observations were made during the course of the disease, with a view to determining the frequency and intensity of the reaction in the various stages and the approximate time of its disappearance. Also, for purposes of comparison, a count of the white corpuscles was always made at the same time that the blood was taken for reaction.

LOBAR PNEUMONIA.

Case.	Age.	Stage of Disease.	Reaction.	Intensity.	% Cells Affected.	White Count.
1	4 years	7th day	+	V. M.	80%	21,400
2	7 years	3d day	+	M.	88%	30,000
3	9 years	4th day	+	M.	84%	13,000
4	8 years	5th day	+	M.	80%	30,000
5	17 months	6th day	+	M.	80%	80,100
6	8 months	6th day	+	M.	80%	28,000
7	21 months	2d day	+	M.	74%	60,000
8	5 years	7th day	+	M.	72%	28,200
9	19 months	2d day	+	M.	72%	44,800
10	3 years	2d day	+	M.	70%	21,800
11	2 years	8th day	+	M.	70%	10,700
12	6 years	3d day	+	M.	66%	7,000
13	9 years	2d day	+	M.	46%	31,000
14	2 weeks	4th day	+	M.	30%	
15	4 years	4th day	+	Av.	80%	28,600
16	4 weeks	5th day	+	Av.	76%	19,000
17	10 months	9th day	+	Av.	70%	10,400
18	2 years	4th day	+	Av.	60%	20,300
19	6 years	2d day	+	Av.	54%	22,000
20	7 years	4th day	+	Av.	50%	18,000
21	2 years	4th day	+	Av.	36%	29,300
22	7 years	3d day	+	Av.	48%	19,100

The results in the twenty-two cases tabulated show the presence of the iodine reaction in all. As to intensity, the reaction was average in eight cases and marked in fourteen. The percent of leucocytes affected was almost uniformly high, the average being 70%. We may conclude from these results that in the active stage of lobar pneumonia in children a positive iodine reaction is the rule, such reaction being often marked, and always at least average in intensity, and that the percentage of leucocytes affected is high, being more than 50% in most of the cases.

The following table shows the results of further observations upon some of these same cases taken at various times after the crisis. In those cases where no distinct crisis occurred, the day the temperature reached and remained at the normal point was considered as equivalent to the day of the crisis.

Case.	Time after Crisis.	Reaction.	Intensity.	% Cells Affected.	White Count.	Remarks.
1	4 hours	+	Av.	60%	12,300	
1	4 days	0				
2	10 days	0				
3	3 days	+	Sl.	6%	7,400	
3	4 days	0				
4	5 days	0				
5	10 days	+	Av.	54%	18,300	Consolidation unresolved. Slight fever.
6	10 days	+	Av.	40%	13,400	Consolidation unresolved.
7	1 day	+	Sl.	8%	24,000	Rise of temperature. Empyema.
7	3 days	+	M.	84%	28,700	
8	9 hours	+	Av.	30%	12,100	
8	3 days	+	Sl.	6%		
8	5 days	0				
9	5 days	0				
10	5 days	0				
11	10 days	+	M.	42%		Consolidation unresolved.
11	15 days	+	M.	88%		Consolidation unresolved.
14	4 days	0				
15	3 days	+	Sl.	12%	14,400	
15	5 days	0				
19	2 days	+	Sl.	28%		Consolidation unresolved.
19	6 days	+	Av.	34%		Consolidation unresolved. Fever again for two days.
19	8 days	+	Av.	48%		Consolidation unresolved.
19	10 days	0				Four days after resolution.
20	1 day	+	Sl.	22%	11,800	
20	3 days	0				
21	12 hours	0				
22	2 days	0				

The results of these observations show that in those cases of lobar pneumonia in which quick resolution occurs the reaction becomes rapidly less marked both in intensity and in per cent of cells affected immediately after the crisis, and quickly disappears. It had disappeared in all cases by the fifth day after the crisis, and in one case (No. 21) it had disappeared in twelve hours; hence we may conclude that it may disappear at any time between the crisis and the fifth day. In cases where the consolidation remains unresolved, even with a normal temperature, as in Cases 5, 6, 11 and 19, the reaction may persist for at least ten or fifteen days. Case No. 7 is interesting as showing the behavior of the reac-

tion when empyema develops after the crisis. In this case the reaction which before the crisis was marked, 74%, white count 60,000, became one day after the crisis slight, 8%, white count 24,000. On the third day after, the temperature rose again and before the signs in the chest were sufficiently well marked to warrant a diagnosis, the reaction had become marked, 84%. The increase in the intensity of the reaction was much more marked than the increase in the leucocyte count, which only rose from 24,000 to 28,700.

BRONCHO-PNEUMONIA.

No.	Age.	Stage of Disease.	Reaction.	Intensity.	% Cells Affected.	White Count.	Remarks.
1	2 years	?	+	M.	74%	12,100	
2	2 years	?	+	M.	74%	12,100	
3	5½ months	?	+	Av.	74%	32,800	Autopsy, tb. broncho-pneumonia with fresh pneumococcus infection.
4	14 months	?	+	Av.	66%	39,000	
5	1 year	3d day	+	Av.	58%	23,800	
6	6 years	7th day	+	Av.	46%	62,100	Complicating pertussis.
7	2 years	?	+	Av.	40%	31,400	Autopsy.
8	2 years	31st day	+	Sl.	30%	15,200	Slight fever.

The results of these observations are very similar to those obtained in lobar pneumonia, the reaction being present in all cases. The stage of the disease could not be absolutely determined, but all but the eighth case were in the active stage.

INFLUENZA PNEUMONIA.

No.	Age.	Stage of Disease.	Reaction.	Intensity.	% Cells Affected.	Remarks.
1	7 years	3d day	+	M.	68%	Complicating (pertussis).
2	11 years	3d day	+	Av.	70%	Complicating (pertussis).
3	9 years	11th day	+	Av.	60%	
4	5 years	7th day	+	Av.	26%	

The reaction was present with at least average intensity in all cases, and a high per cent of corpuscles was affected in a majority of the cases observed.

Further observations showed that in Cases 2 and 3 the reaction disappeared on the fourth and third days respectively, after the temperature reached the normal. In Case 1 the disease ran a

very prolonged course, the reaction being average, 30%, white count 12,400 on the twenty-first day. The patient was discharged on the one hundred and fourth day with some fever and several areas of consolidation in the chest. The reaction on the day of discharge was slight, 8%, white count 9,100. Case 4 also ran a long course. The reaction was average, 30%, white count 19,200 on the thirty-first day.

TYPHOID FEVER.

Of ten cases the reaction was positive in nine at some stage of the disease. In one case (No. 8) it was absent on the third day

No.	Age.	Stage of Disease.	Re-action.	Inten-sity.	% Cells Affected.	White Count.	Remarks.
1	9 years	1st week	+	M.	74%	19,200	Comp. with septic pharyngitis.
2	34 years	5th day	+	M.	62%	9,500	Comp. with Otitis media.
3	34 years	12th day	+	Av.	40%		No complication.
4	10 years	4th day	+	Av.	40%	4,800	" "
5	10 years	1st week	+	Av.	18%	5,200	" "
6	10 years	1st week	+	SL.	70%	8,400	Widal-O. " No complication.
7	5 years	8th day	+	SL.	50%	7,000	No complication.
8	5 years	8th day	+	SL.	32%	10,200	" "
9	6 years	5th day	+	SL.	8%	5,800	" "
10	7 years	7th day	0			9,000	" "

but present on the eighth day, but in all other cases it was present at the first examination, the stage of the disease varying from the fourth to the twelfth day. In one case the reaction was absent on the first examination and remained so throughout the disease. In the uncomplicated cases the intensity was slight or average, and the per cent of cells affected in all but one case (Case No. 6) was under 50%. In the two cases, with complications, the intensity was marked and the per cent of cells affected high.

Further examination on some of these cases, made with a view to determine the persistence of the reaction after the temperature reached the normal, were as follows:

No.	Temperature Normal.	Reaction.	Intensity.	% Cells Affected.	Remarks.
3	8 days	+	Av.	18%	Chronic discharging ear.
3	13 days	+	M.	14%	Chronic discharging ear.
3	18 days	+	SL.	28%	Chronic discharging ear.
3	28 days	0			
4	8 days	0			
6	8 days	0			
7	11 days	0			
8	7 days	+	SL.	18%	
8	16 days	+	SL.	28%	
9	10 days	0			

In four uncomplicated cases the reaction disappeared between the eighth and the eleventh day. In one uncomplicated case (No. 8) the reaction persisted until the patient was discharged, on the sixteenth day. In one case complicated with chronic discharging ear the reaction persisted until the twenty-eighth day.

Conclusions. — In typhoid fever in children the iodine reaction is usually present, but may be absent. It is of less intensity and shows a smaller per cent of cells affected than in the pneu-

monias, but it persists, as a rule, for a much longer time, and may persist for more than two weeks after the temperature reaches the normal.

CEREBRO-SPINAL MENINGITIS.

In all of the following cases the Diplococcus intracellularis was at some time found in the cerebro-spinal fluid:

No.	Age.	Stage of Disease.	Re-action.	Inten-sity.	% Cells Affected.	White Count.	Remarks.
1	24 years	3d day	+	V. M.	68%	13,300	Severe case.
2	10 months	18th day	+	M.	72%	21,700	Autopsy.
3	3 years	26th day	+	Av.	52%	30,000	Severe case.
4	4 months	3d day	+	Av.	24%	43,300	Mild case.
5	13 months	90th day	+	SL.	30%	29,600	Chronic relapsing case.

These observations, though limited in number, suggest that the reaction is always present during the active stage of this disease, and that the intensity and per cent of cells affected show a correspondence with the severity of the symptoms. Case 2 was fatal, Cases 4 and 5 made a complete recovery, Cases 1 and 3 became chronic, and both at the present writing are still totally unconscious with muscular contractions, Case 3 being on the two hundred and fiftieth day and Case 1 on the one hundred and fiftieth day since the onset of the symptoms. Further observations on these cases were as follows:

No.	Stage of Disease.	Re-action.	Inten-sity.	% Cells Affected.	White Count.	Remarks.
1	19th day	+	Av.	30%	10,400	Still fever.
1	35th day	0			11,200	Temperature normal.
3	36th day	0			24,600	Still moderate fever.
3	113th day	0			18,000	Temperature normal.
4	28th day	+	SL.	10%	18,400	Temperature normal.
4	35th day	+	Av.	20%	37,200	During relapse of fever.
4	50th day	0			18,000	Temperature normal.
5	120th day	+		86%	44,700	During severe relapse.
5	150th day	0			21,900	Temperature normal.

It would seem that the reaction disappears in cases where the active process, as evidenced by fever, subsides, even in the chronic cases where the child remains unconscious, but that the reaction persists in those cases where there are relapses.

ACUTE MILIARY TUBERCULOSIS.

Of the following cases, in Nos. 2, 5, 7 and 8 the diagnosis was confirmed at autopsy; they had all been diagnosed clinically as tubercular meningitis.

In Case 3 glands excised post mortem were found to be tuberculous.

In Cases 4 and 6 the cerebro-spinal fluid obtained by lumbar puncture was characteristic of tubercular meningitis, but the clinical type of the disease was pulmonary with severe dyspnea and cyanosis.

In Case 7 the disease developed on a chronic pulmonary tuberculosis, tubercle bacilli having been found in the sputum.

No.	Age.	Stage of Disease.	Reaction.	Intensity.	% Cells Affected.	White Count.	Remarks.
1	11 years	5th day	+	Av.	34%	5,600	
2	7 months	5th day	+	Sl.	52%	18,000	Two weeks before death.
3	6 years	?	+	Sl.	50%	25,600	
4	7 months	?	+	Sl.	22%	27,500	Four days before death.
5	11 years	?	+	Sl.	12%	16,000	Exam. made twenty-four hours before death.
6	2 years	?	+	Sl.	4%	18,900	Three days before death.
7	4 years	7th day	0			16,300	Three days before death.
8	2½ years	?	0			11,300	Twenty-four hrs. before death.

From these observations it appears that the reaction may be either present or absent. When present the intensity is usually slight, and the per cent of cells affected comparatively low.

ANEMIA.

These cases of anemia were all of the secondary type. In Cases 2 and 3 second observations were made.

No.	Age.	Hgb.	White Count.	Red Count.	Reaction.	Intensity.	Cells Affected.
1	10 months	30%	27,100	2,000,000		Av.	60%
2	3 years	30%	17,800	2,160,000		Av.	34%
3	2 years	20%	12,900	1,516,000		Av.	22%
3	2 years	55%	16,000	2,320,000		Sl.	30%
3	2 years	65%	14,800	5,008,000	0		
4	2 years	35%	6,000	3,440,000	0		
5	2 years	40%	10,700	4,300,000	0		
6	6 months	40%	6,300	3,500,000	0		

In general from this limited number of cases it would seem that the iodine reaction is present in the more severe anemias, absent in the milder ones, and when present a low per cent of cells is affected. Case 3 is interesting, showing the disappearance of the reaction coincident with improvement in the condition of the blood.

INFLUENZA.

I have included under this heading seven cases, all of which were obviously acute infections, but in none of them was the precise nature and localization of the infection determined. They all presented clinical pictures greatly resembling the ordinary grippe attacks, and they occurred at a time of year when cases of influenza pneumonia were common. In no one of them was a satisfactory specimen of sputum obtained. In all of these cases the iodine reaction was positive and of average intensity. The percentage of cells affected varied between 30% and 66%. Leucocytosis was absent in five cases, present in two.

NEPHRITIS.

The first five cases were acute, the last two of the chronic glomerular type.

No.	Age.	Stage of Disease.	Reaction.	Intensity.	% Cells Affected.	White Count.	Remarks.
1	4 years	?	+	M.	68%	27,600	Complicated with acute follic. tonsillitis.
2	4 years	?	+	Av.	68%	16,600	Complicated with eczema.
3	3 years	10th day	+	Av.	54%	12,700	Severe case.
4	6 years	10th day	0			14,000	Mild case.
5	3½ years	?	0			17,300	Marked edema but no uremic symptoms.
6	7 years	?	0			19,600	Edema. No uremic symptoms.
7	6 years	?	0			17,000	Edema. No uremic symptoms.

From this small number of cases the reaction would seem to be positive in the severe acute cases, absent in the mild or chronic cases.

PLEURISY AND EMPYEMA.

A. WITH SEROUS EFFUSION.

No.	Age.	Stage of Disease.	Reaction.	Intensity.	% Cells Affected.	White Count.	Remarks.
1	5 years		0			11,300	Fifth day traumatic otology.
2	3 years		0			13,000	Duration unknown. Tb. reaction.
3	9 years		0			13,000	Tb. reaction.

B. EMPYEMA.

No.	Age.	Stage of Disease.	Reaction.	Intensity.	% Cells Affected.	White Count.	Remarks.
M.			+		88%	29,600	Pneumococcus infection.
M.			+		76%	31,000	Streptococcus infection.
M.			+		64%	20,700	Pneumococcus infection.
Av.			+		26%	16,000	Pus, sterile, tb. reaction.

The results in this small number of cases agree with those of Cabot and Locke, based on a larger number of cases. Case 7 is interesting as showing the probable relation between the character of the infection and the intensity of the reaction, and the per cent of cells affected.

FUNCTIONAL INDIGESTION.

Observations were made on seventeen cases of gastric and intestinal indigestion. These included twelve cases in early infancy, so-called feeding cases, and five cases in middle childhood. Of the latter, one was a severe case of gastroduodenitis, with severe jaundice. The iodine reaction was negative in all cases, nor did any of the cases show a leucocytosis.

CHRONIC VALVULAR CARDIAC DISEASE.

Six cases were examined, in all of which compensation was disturbed, in one of which it was wholly broken. The reaction was negative in five cases, slight, 8%, in the sixth case, this being the case of badly broken compensation.

OTHER DISEASES.

The following table (see next page) includes all cases in which only one or only a few observations could be made.

The number of cases in the above table is too few to warrant the drawing of any general conclusions. So far as they go the results agree with those of Cabot and Locke in similar cases.

The two cases of abscess were especially interesting in that the clinical diagnoses were the reverse of what was found to be the case on an examination of the pus. Further observations are needed to determine if a so-called cold abscess can be distinguished from a septic abscess by means of the iodine reaction. The three cases of pericarditis are interesting from the fact that the variation of the reaction seems to agree with

the nature of the cause, the pneumococcus infection giving a very marked reaction with a high per cent of cells affected, and the rheumatic pericarditis giving a negative reaction, the probable tubercular pericarditis being midway between.

The results of the above observations as far as they go are in general confirmatory of the

(2) The reaction is usually present but may be absent in cases of typhoid fever, and miliary tuberculosis.

(3) The reaction may be absent or present in anemia.

(4) The reaction is usually absent but may be present in nephritis, cardiac valvular disease and tuberculosis.

Disease.	No.	Age.	Reaction.	Intensity.	% Cells Affected.	White Count.	Remarks.
Abscess (staphylococcus)	1	6 yrs.	+	Av.	84%	21,000	
Abscess (tubercular)	1	5½ yrs.	+	SL.	16%	22,000	Three days after first attack subsided.
Appendicitis	{ 1		+	Av.	28%	41,400	Onset of second attack.
	{ 1		+	Av.	20%	27,200	During second attack.
	{ 2	1½ yrs.	+	Av.	30%	26,300	Subacute.
Bronchitis (acute)	1	3 yrs.	0			17,600	
	2	2 yrs.	0			15,400	
Bronchitis (chronic)	1	6 yrs.	0			10,700	
Cardiac disease (congenital)	1	6 yrs.	0			12,000	Marked cyanosis.
	2	8 mos.	0			11,800	
Chorea	1	9 yrs.	0			6,000	
	2	12 yrs.	0			8,000	
	3	3½ yrs.	0			12,600	
Diphtheria	1	4 yrs.	+	V. M.	56%	20,400	Most marked in intensity of any obtained.
Eczema	1	3½ yrs.	0			16,100	
Infantile atrophy	1	6 mos.	0			12,000	
Influenza (chronic, bacilli found)	1	3½ yrs.	+	SL.	8%	9,600	
Osteomyelitis	1	7 yrs.	+	M.	78%	32,000	
	2	9 yrs.	+	M.	86%	33,000	
	3	6 yrs.	+	M.	80%	21,000	
Otitis media (acute)	1	4½ mos.	+	Av.	64%	32,000	Thirty-third day.
	2	3 yrs.	+	SL.	20%	26,200	Seventh day.
Pericarditis	1	18 mos.	+	V. M.	66%	60,000	Purulent, pneumococcus infection.
	2	9 yrs.	+	SL.	32%	11,500	Comp. pulmonary tuberculosis.
	3	11 yrs.	0			18,000	Following rheumatism.
Pharyngitis (septic)	1	5 yrs.	+	SL.	12%	19,600	
Purpura rheumatica	1	9 yrs.	0			11,100	
Rhachitis	1	20 mos.	0			16,200	
	2	20 mos.	0			15,400	
	3	21 mos.	0			7,400	
Rheumatism (acute articular)	1	7 yrs.	0			14,100	
	2	8 yrs.	0			22,600	
Rheumatism (chronic articular)	1	8 yrs.	0			13,000	
Starvation	{ 1	2 yrs.	+	M.	76%	13,400	Acute stage.
	{ 1		+	Av.	44%		After four days.
	{ 1		+	M.	50%		During tb. reaction.
Scorbutus	1	13 mos.	0			18,400	
Tuberculosis							
Adenitis	1	14 mos.	+	SL.	22%	22,200	With severe second day anemia.
Meningitis	1	5 yrs.	0			22,000	Diagnosis based on lumbar puncture.
	2	4 yrs.	0			19,600	Diagnosis based on lumbar puncture.
Peritonitis	1	8 yrs.	+	V. M.	80%	6,900	Very sick, probable mixed infection.
Pulmonary	1	11 yrs.	0			20,300	Bacilli found in sputum.
	2	9 yrs.				14,200	Tb. reaction+.
	3	3 yrs.	0			14,300	

theory that the iodine reaction is a measure of the degree of toxemia. The observations on cerebro-spinal meningitis, on acute nephritis and on anemia are especially interesting in connection with this point. The single observation in the case of diphtheria gave the most marked reaction in intensity of any I have seen. I have not seen any other observation on this disease. The result is what one would expect in a disease characterized by so very profound an intoxication.

SUMMARY.

A general summary of the results, though necessarily imperfect from the comparatively small number of cases observed, may yet be of some use for comparison with future observations. It would be as follows:

(1) The reaction is always present, usually of average and often of marked intensity, a high percentage of cells being affected in the following conditions: Lobar pneumonia, broncho-pneumonia, cerebrospinal meningitis, influenza (see above), empyema, suppuration (non-tubercular), and was found present in single cases of appendicitis, diphtheria and starvation.

(5) The reaction is absent in pleurisy with effusion, functional indigestion, rachitis, articular rheumatism, congenital cardiac disease, chorea, infantile atrophy and was found absent in single cases of bronchitis, eczema, purpura, urticaria and scorbutus.

Clinical Department.

MIRROR WRITING.

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ACCOMPANYING this paper is an admirable specimen of that curious anomaly known as mirror writing. The author was a boy about seven or eight years old who had been referred to me because of his very peculiar handwriting. The eyes were normal and the boy's teacher was assured that the condition would gradually be outgrown. Some months later the boy had accustomed himself to write correctly most of the time; but his teacher, who has kept an intelligent eye upon him, stated that when he became tired or even in some cases confused from