

lead and other substances in front in order to be able to estimate the amount of the ionization due to pair production alone. This will be described in detail in a later publication; the result was that 1 r on the carbon corresponds to 4.9×10^7 quanta traversing it, where the number of quanta is defined as the total x-ray energy divided by the upper limit energy. (The actual number of quanta in a range between E_1 and E_2 is approximately $\ln (E_2/E_1)$ times the above number.) The total cross section per quantum per carbon nucleus is then found to be 5×10^{-28} cm². It is hard to make an estimate of the over-all accuracy of this figure, but it is probably not wrong by more than a factor of 2. The difference between this value and that given in reference 2 is easy to under-

stand, since the latter, made from Geometry 1 plates, included only very low energy mesons. One run was made at an x-ray energy of 200 Mev; here the meson energy distribution extends only to about 35 Mev, and the yield is considerably less than at 335 Mev. Because of the large self-absorption of the mesons at this energy, no attempt was made to calculate a cross section.

References

1. ADELMAN, F. L. and JONES, S. B. *Phys. Rev.*, 1949, **75**, 1468.
2. McMILLAN, E. M. and PETERSON, J. M. *Science*, 1949, **109**, 438.
3. SMITH, F. M. Private communication.

Experimental Control in Hypnotic Age Regression States

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THE RECOVERY OF EARLY CHILDHOOD MEMORIES, lost through the ordinary processes of forgetting or because of subconscious repression, has a definite place in modern psychotherapy. The importance of catharsis has long been recognized, but too little work has been carried out to determine whether hypnotic age regression is a fact, or, as Young (4) believes, an artifact. Too few adequately controlled experiments have been carried out which separate and distinguish between half-conscious dramatization of current memories of a previous time and actual revivification of behavior patterns of a suggested earlier period of life in terms of what actually belongs there. Since both conditions may exist during a sitting, the importance of constant control cannot be overemphasized. Erickson and Kubie (1) recognized the existence of these two states and yet utilized hypnotic age regression with a great deal of success in the treatment of hysteria without determining which state was involved. The fact that psychotherapy based upon a supposed memory is of value to a patient is hardly satisfactory evidence of a true regression, since it is always possible that a pseudomemory may be effective in such a case (3). This has been shown quite con-

clusively in the use of play or dramatic therapy, both in the waking state and during hypnosis.

Information from relatives, verbal material memorized at an early age, and diaries are unsatisfactory controls, since the normal processes of forgetting must be considered in the first case, the possibility of review in the second, and the recognized inaccuracy of diaries written at an early age in the last case. The factor of the recall of very recently learned material may be of value from an academic viewpoint but is obviously unsatisfactory for hypnoanalytical purposes, where remote memories are of primary importance.

For the most part, the use of hypnosis in age regression has been interpreted in terms of a hypothetical state called *dissociation*. Psychoanalysis and hypnoanalysis are actually doctor-patient battles, with the patient trying to retain his compulsions and the operator equally determined to eliminate them. The evidence points at the fact that the recall of actual traumatic experience is more efficacious in bringing about beneficial results in the treatment of a neurosis than the reliving of an imagined experience (2), although it must be recognized that neither one invariably brings about the desired therapeutic change.

It is easy to see the importance of certain controls in determining whether or not actual age regression has occurred. The writer has devised a method of control which has proved effective in 82.3 percent of a mixed group, as shown in Table 1. Before induc-

TABLE 1
HYPNOTIC AGE REGRESSION STATES OF 50 SUBJECTS
(40 MALES, 10 FEMALES; AGES 20-24)

	No. of subjects	Per- centages	Male	Female
<i>Age 10</i>				
Birthday:				
Correct answer	46	92	37	9
Incorrect answer	4	8	3	1
Christmas:				
Correct answer	47	94	37	10
Incorrect answer	3	6	3	0
<i>Age 7</i>				
Birthday:				
Correct answer	42	84	36	6
Incorrect answer	8	16	4	4
Christmas:				
Correct answer	40	86	34	6
Incorrect answer	10	14	6	4
<i>Age 4</i>				
Birthday:				
Correct answer	31	62	24	7
Incorrect answer	19	38	16	3
Christmas:				
Correct answer	38	76	31	7
Incorrect answer	12	24	9	3

tion, subjects were asked to state the day of the week during which certain relatively recent events had occurred. An extremely small percentage gave correct answers to any of the questions, leading one to believe that when correct answers were given they were

largely owing to chance. After hypnotic induction, subjects were subjected to the usual tests for depth of hypnosis, such as the induction of positive and negative hallucinations, analgesia, and the inhalation of ammonium hydroxide (with the suggestion of inhalation of a pleasant perfume). They were then regressed year by year, using memorable dates as chronological landmarks. On such dates they were asked, "What day is this?" and their answers were scored against a 200-year calendar. Of the mixed group of 40 men and 10 women 82.3 percent gave entirely accurate answers to these questions, while the remaining 17.7 percent answered less than half the questions correctly. The inaccurate answers might well be explained by individual differences in retentiveness through developmental years or by the fact that this small group of people were dramatizing memories in the light of their present beliefs. It should be noted that all members of the test group had previously been regressed to at least the age of 5 prior to the sessions in which they were subjected to control. All were excellent somnambules and had been chosen from a group of 175 as being the best subjects. All questions asked were simple and direct. Subjects were merely asked on what days of the week Christmas and their birthdays fell in the particular years involved and were scored on the basis of regression to ages 10, 7, and 4.

A method of control of this sort is much easier to handle than some of the more involved techniques utilizing electroencephalography and the thematic apperception test, its simplicity making it more practicable clinically.

References

1. ERICKSON, M. H. and KUBIE, L. S. *Psychoanal. Quart.*, 1941, **10**, 592.
2. PLATANOW, K. I. *J. gen. Psychol.*, 1933, **9**, 190.
3. STALNAKER, J. M. and RIDDLE, E. E. *J. gen. Psychol.*, 1932, **6**, 429.
4. YOUNG, P. C. *J. abnorm. soc. Psychol.*, 1940, **35**, 273.

