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THE PERCEPTION AND MEMORY OF WITNESSES

DILLARD S. GARDNER*

The vast majority of testimonial errors—and every trial lawyer knows they are numerous—are those of the average, normal honest man, errors unknown to the witness and wholly unintentional, represented in the great body of testimony which is *subjectively* accurate but *objectively* false. What are the factors determining the accuracy and reliability of the memory of a particular witness? Juries quite generally regard the assertiveness and positiveness of the witness as the best test of accuracy, but experimental psychology has demonstrated that the most positive feeling of accuracy is no guarantee of, or evidence of, the truthfulness of the testimony.¹ This is not the only nugget of scientific fact with which the legal psychologists are quietly discrediting the *ex cathedra* vaporings of appellate judges, the technical and involved commentaries of biologists and physiologists, and the dry, mechanical theories of the behaviorists and mechanists. Memory is a matter for the psychologists, yet even they differ among themselves—the objectivists use “memory” in a strained, technical sense,² the imagists consider it almost solely a question of imagery,³ the gestaltists are fairly losing themselves in metaphysics.⁴ Little wonder that lawyers and jurists, generally, have been unable to learn anything of the true nature of memory.⁵ Upon what bases shall we test the reliability of testimony which is neither perjured nor the product of unsound minds?⁶ What of value, concerning memory,

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¹The variability of memory is generally recognized: OSBORN, *THE PROBLEM OF PROOF*, pp. 195, 196; MÜNSTERBERG, *ON THE WITNESS STAND*, p. 155; 23 *C. J.*, *Evid.*, § 1765, n. 9; *Kinleside v. Harrison*, (Eng.) 2 *Phillim.* 449, 534; 161 *Rep.* 1196. “The feeling of accuracy is no proof of correct reproduction.” SWIFT, *PSY. AND DAY’S WORK*, p. 288. To same effect: MÜNSTERBERG, *supra*, p. 56; ARNOLD, G. F., *PSY. APPLIED LEG. EVID.*, (1906) p. 172-180.

²WATSON, *PSY. FROM STANDPT. BEHAVIORIST*, (1929) 335.

³Allport *Eidetic Imagery* (1924) 15 *BRIT. J. PSY.*

⁴KOFFKA, *THE GROWTH OF MIND*, (1924); M. WERTHEIMER, *DREI ABHANDLUNGEN ZUR GESTALTTHEORIE*, (Erlangen—1925).

⁵“The behaviorist never uses the term memory. He believes it has no place in an objective psychology.” WATSON, *BEHAVIORISM* 177.

⁶C. T. McCormick, *Deception Tests and Law of Evidence*, (1926) 15 *CAL. L. REV.* 484; *AM. J. POLICE SCIENCE* (Sept.-Oct. 1931). Association, breathing, and blood pressure techniques discussed in detail. BURTT, *LEG. PSY.* (1931) 177-256; “Scopolamin anaesthesia” is treated in Herzog’s *MED. JURISPRUD.* (1931) § 472; the pneumocardio-sphygmometer is explained by J. A. Larsen from his

can the infant science, legal psychology, today present to trial lawyers?

The basic principle in memory is the law of association—if two states of consciousness have been experienced together, when one of them enters consciousness the other tends to follow (the concept of contiguity), and of two objects having characteristics in common, the sight of one arouses the recall of the other (the concept of similarity).⁷ What recollection memory shall call forth by reason of a particular stimulus is determined by a host of factors which have been grafted upon this fundamental law of association. These various factors have been grouped under various "principles of association". Thorndike names two: frequency, the law of exercise,⁸ and pleasure, the law of effect;⁹ Watson names frequency and recency;¹⁰ Hunter favors frequency, recency, and the "neural processes underlying pleasure;"¹¹ for our purposes the most suitable would appear to be: frequency, recency, and intensity.¹²

Upon frequency all are in agreement: *We tend to remember what we observe or recall frequently.* National advertisers annually spend millions in reliance upon this truth. The witness who has observed the scene repeatedly or upon several occasions recounted his evidence in detail, to the lawyer, will not inadvertently change the details materially on the witness stand, for the images are kept alive, or revived, by these repetitions.¹³ This repetition, to a tactful and sympathetic lawyer, has a further desired effect: The witness increasingly tends to recount the evidence in the light most favorable to the lawyer's view of the case.¹⁴

As to recency: *The more recent the experience, the better the memory of*

Report before the 45th Am. Bar Ass'n, in MEDICO-LEGAL JOURNAL, Vol. 40, No. 1 (1923). As to questions of lying among neurotics and psychotics, see HEALY, PATHOLOGICAL LYING, ACCUSATION AND SWINDLING (1915).

⁷BURTT, LEG. PSY. (1931) 68; WOODWORTH, PSY. A STUDY OF MENT. LIFE 395-398; WUNDT, HUMAN AND ANIMAL PSY. 296, 297; SULLY, OUTL. PSY. 214.

⁸THORNDIKE, EDUC. PSY., Brief. Course, p. 256-257.

⁹THORNDIKE, PSY. OF LEARNING, (1913).

¹⁰WATSON, BEHAVIOR, (1914), c. VII.

¹¹HUNTER, GEN. PSY. 331.

¹²CATT, H. A., *Principles of Selection in Animal Learning*, (1914) 21 PSY. REVIEW 157.

¹³"The value of repeating facts in strengthening memory is well known." McCARTY, PSY. FOR LAWYER, p. 225, 228; ARNOLD, PSY. APPLIED LEG. EVID. 105, 403; SULLY, OUTL. PSY. 214; TITCHENER, A BEGINNER'S PSY. 186; WILLIAM JAMES, PRIN. PSY., Vol. I, p. 373.

¹⁴HOFFMAN, PSY. AND COMMON LIFE, 69; SWIFT, PSY. AND DAY'S WORK 290; JAMES, PRIN. PSY., Vol. I, 372-373.

it.¹⁵ You remember the tie you wore yesterday, but scarcely the one you wore last Christmas. The speed with which we forget is shown graphically in the "curve of forgetting," demonstrating that we forget very rapidly immediately after the perception according to a law of progressively diminishing speed,¹⁶ a progressive fading of memory.¹⁷ Ebbinghaus, working with nonsense syllables, found 55.8% forgotten the first hour, 65% the first half-day, 75% the first week;¹⁸ later studies show 56% after an hour, 64% after 8 hours, 66% after one day.¹⁹ Strong, testing memory of words, found 27% forgotten in 5 minutes, 42% in 30 minutes, 60% in 8 hours, 71% in a day, and 90% in a week.²⁰ In trials witnesses usually testify as to details of views or scenes, rather than words or syllables or symbols; Dallenbach testing memory of a picture or scene found 14% forgotten in 5 days, 18% after 15 days, 22% after 45 days,²¹ but these witnesses were warned that they would be tested later and probably observed more carefully than they would have otherwise. As yet we have no study of an actual scene, in which moving pictures have secretly been taken, against which to check the evidence of witnesses (which would most nearly approximate actual conditions) but the true rate of forgetting, for witnesses, as to words spoken should be slightly less rapid than the rates of Strong, and as to visual scenes recalled should be slightly more rapid than the rates of Dallenbach. Clearly enough, we quickly forget the bulk of what we perceive, our retention decreasing as the time interval increases. Claim agents and adjusters long ago learned the difference in the value of a statement one day after an accident and one a month after it; every trial lawyer knows how disconcerting it may be to have a witness, on cross examination, confronted with an old and forgotten signed statement. Signed statements from all important witnesses, at the first opportunity, in personal injury cases, are especially important where the trial may be long delayed or the

¹⁵"Memory is clear and strong in proportion to its recency." 23 C. J., *Evid.*, § 1764; JAMES PRIN. PSY., Vol. I, p. 670.

¹⁶STRATTON, EXPERIMENT. PSY. 169.

¹⁷Bean, *The Curve of Forgetting*, PSYCHOL. ARCHIVES, No. 21.

¹⁸EBBINGHAUS, MEMORY, A CONTRIBUTION TO EXPER. PSYCHOLOGY, (1913 Trans.); HUNTER, GEN. PSY. 329; GATES, ELEM. PSY. 329; WOODWORTH, PSY. A STUDY OF MENT. LIFE, at p. 350, showing Ebbinghaus graph.

¹⁹BURT, LEG. PSY., p. 88; Radossawljewitch's studies: HUNTER, GEN. PSY., p. 329.

²⁰Strong, *Effect of Time Interval upon Recognition Memory*, 20 PSY. REV. 339; WOODWORTH, PSY. A STUDY OF MENT. LIFE, p. 351.

²¹Dallenbach, *The Relation of Memory Error to Time Interval*, 20 PSY. REV. 323; WOODWORTH, PSY. A STUDY OF MENT. LIFE, p. 352.

opposing side has constant or easy access to the witnesses. Where an entry, notation, or memorandum is made weeks after the incident, it is both good law²² and sound psychology²³ to allow it to be used to refresh recollection, but the trial judge should carefully safeguard this procedure from abuse, as it may have been written at a time when the curve of forgetting shows a large part of the matter forgotten and possibly inaccurate details supplied.²⁴ Entries in account books, made at the time, are admissible in evidence under certain conditions;²⁵ in determining what is "at the time", the curve of forgetting should govern. If two conflicting statements of the same witness about the same incident be brought out in evidence, it is proper for the judge to instruct that the jury may give greater credit to the statement nearer the incident described,²⁶ and from the psychological viewpoint it would be his duty to do so.

Intensity—the emotional factor—includes many lesser ideas: *The more vivid, striking, or impressive the scene, the clearer and more retentive the memory of it.*²⁷ The extraordinary, colorful, novel,²⁸ unusual,²⁹ and interesting³⁰ scenes attract our attention and hold our interest, both attention and interest being important aids to memory.³¹ The opposite of this principle is inversely true—routine, commonplace and insignificant circumstances are rarely remembered as specific incidents—and this is accepted by our courts;³² memory for incidental details not attended to is poor, as these are not fixated or

²²WIGMORE, EVIDENCE, Vol. I, § 761; *Rosenmann v. Belk-Williams Co.*, 191 N. C. 493, 132 S. E. 282 (1926).

²³We tend to remember in "constellations" and the more details we can recall to the witness, the more apt he is to recall a forgotten item: BURTT, LEG. PSY., pp. 76-77.

²⁴*Supra* notes 20, 21. 23 C. J., *Evid.*, § 1769, n. 34, 35, 36.

²⁵WIGMORE, EVID., Vol. III, § 2118; *Dyeing Co. v. Hosiery Co.*, 126 N. C. 292, 35 S. E. 586 (1900).

²⁶23 C. J. *Evid.* § 1764, n. 80—24 cases cited.

²⁷HERZOG, MED. JURISPRUD., p. 433; WOODWORTH, PSY. A STUDY OF MENT. LIFE, p. 345, 379.

²⁸Novelty and interest aid memory. 23 C. J., *Evid.*, § 1764, n. 82, citing JAMES, PRINC. PSY., Vol. I, p. 673.

²⁹23 C. J. *Evid.* § 1764, notes 86, 93.

³⁰HERZOG, MED. JURISPRUD., p. 435. Uninteresting things may not be retained in memory: *Hayden v. Suffolk Mfg. Co.*, 11 Fed. Cas. 900 (1862), aff. 3 Wall (U. S.) 315; 18 L. Ed. 76 (1866); *Swain v. Edmunds*, 53 N. J. Eq. 142; 32 Atl. 369 (1894), aff'd 54 N. J. Eq. 438, 37 Atl. 1174 (1896).

³¹"Attention is proportional to new and interesting character." JAMES, PRINC. PSY., Vol. I, p. 673.

³²Especially is this true in proof of the attestation of signatures. 23, C. J., *Evidence*, § 1764, n. 86, 87, 88, 89, 90.

impressed upon the mind.³³ Surprise or shock, such as an auto accident or a sudden shooting, draws attention to the causes of the emotion and thus divides the attention as to the incident itself and details immediately following it, rendering memory for events just prior to the emotion particularly keen,³⁴ that for events accompanied by or following the emotion less reliable.³⁵ Shock, fright or pain impress the event upon the mind,³⁶ fear, pleasure or pain aid retention.³⁷ Emotional disturbance inhibits accurate perception while it exists or immediately thereafter,³⁸ Jaffa finding the memory error 17% greater than when emotion and feeling were absent.³⁹ The law recognizes that a startling occurrence may cause the witness to be particularly observant of the causes,⁴⁰ and that excitement or commotion attending an incident tends to produce discrepancies in the narratives of witnesses.⁴¹ The principle of intensity is the basis for the admission of spontaneous declarations immediately after an accident or injury;⁴² the law assumes that this state of physical shock or nervous excitement prevents the creation of falsehood and is sufficient assurance of subjective and objective accuracy with refer-

³³Harvard students (100) asked to observe every act professor did during a given time interval; with left hand he held up a spinning color wheel, with the other did six distinct acts including removing cigarette from case and snapping case shut. Eighteen students saw *only* his holding the spinning wheel. MÜNSTERBERG, *ON THE WITNESS STAND*, p. 29. Myers presented cards containing certain letters, asking subjects to observe the number of O's; the cards were yellow, the border black dots, and the letters red; only 1 in 450 noted these, one-half recalled color of background of cards, one-half the color of the letters, one-fourth the color of the border. G. C. Myers, *A Study of Incidental Memory*, ARCHIVES OF PSY. (1913), No. 26. Achilles found incidental memory of nonsense syllables 81%, but memory of names of photographs shown, only 57%. E. M. Achilles, *Experimental Studies in Recall and Recognition*, ARCHIVES PSY. (1920), No. 44.

³⁴"Memory for events just previous to a violent emotion is keener than for events immediately after, or events accompanied by emotion." Stratton, *Retroactive hyperamnesia*, (1919), 26 PSY. REV., 474. Whittey, however, could not find this. Whittey, *The Dependence of Learning and Recall upon Prior Mental and Physical Condition*, (1924), 7 J. EXPER. PSY. p. 420.

³⁵"Emotions (surprise, shock, etc.) narrow attention to the particular stimulus that aroused them. . . thus draws the attention away from the thing to be described." HUNTER, GEN. PSY., p. 134.

³⁶HERZOG, MED. JURISPRUD., p. 433.

³⁷ARNOLD, PSY. APPLIED LEG. EVID., p. 185.

³⁸BURTT, LEG. PSY., p. 73, 78, 441.

³⁹S. Jaffa, *Ein Psychologische Experiment im Kriminal Seminar der Universität Berlin*, cited, BURTT, LEG. PSY., p. 72.

⁴⁰23 C. J., *Evid.*, § 1764, n. 92, 93, 95.

⁴¹Giltner v. Gorham, 10 Fed. Cas., 424, 4 McLean 402 (1848); U. S. v. McGlue, 26 Fed. Cas. 1092, 1 Curt. 1 (1851); Williams v. Hall, 1 Curt. Eccl. 597.

⁴²WIGMORE, EVIDENCE, Vol. III, § 1747 (1).

ence to the observed causal details just *prior* to the existence of the emotion, but law should, but does not, note that *after* the emotion appears the reliability of the perception (subjective accuracy) is lost. An auto driver, who experiences no emotion until after the dangerous incident is passed, would be a reliable witness as to the details of the incident, but a guest, who saw the danger and screamed when the danger first appeared, would be quite unreliable as to details *after* the fear was felt by the guest. The suggestion has been made that statements made immediately after the emotion subsides, upon rigorous cross-examination, should yield the highest practical degree of accuracy at any time obtainable.⁴³

In addition to recency, frequency, and intensity we find certain miscellaneous factors affecting memory; for example, the "pleasure principle"—*we remember best what we like, next what we dislike, and poorest of all those things to which we are indifferent.*⁴⁴ Too, accuracy and retention are affected by whether the detail was barely noticed (underlearned), observed with average attention (learned), or carefully, repeatedly scrutinized (overlearned).⁴⁵ Further, the existence of fatigue in the witness, the rapidity with which details crowd upon the perceptive faculties, the absence of interfering habits, associations and distractions—all prevent the fixation of details and the establishment of neural paths and associations, with resultant poor memory,⁴⁶ while a paralyzing shock or blow upon the head may destroy all recent fixations, with resulting total loss of memory of the events immediately preceding the shock or blow, indicating that it takes time for the perceptions to register upon the brain and that they must not be either crowded or shaken until "set."⁴⁷

Concentrated attention⁴⁸ coupled with the intention to remember⁴⁹ constitutes "study"⁵⁰ and naturally improves memory. Rarely do

⁴³Hutchins, R. M. and Slesinger, D., *Some Observations on the Law of Evidence* (1928) 28 COL. L. REV. 432-440.

⁴⁴Children asked to list foods, animals, and colors, then asked, to list those they liked and disliked. Check showed first list ran high for those liked, next for those disliked, and lowest for those to which they were indifferent. G. C. Myers, *Affective Factors in Recall*. (1915) 12 J. PHIL. AND SCIEN. METHODS 85.

⁴⁵Euh, *The Condition of Retention* (1922) 31 PSY. MONOGRAPHS No. 142; Tolman, *The Effects of Underlearning Upon Short and Long Term Retention*, (1923), J. EXPER. PSY., p. 466.

⁴⁶HUNTER, GEN. PSY., p. 317.

⁴⁷BURTT, LEG. PSY., pp. 78, 79, 80; HERZOG, MED. JURISPRUD., p. 436.

⁴⁸JAMES, PRIN. PSY., Vol. 1, p. 669; Attention is reflected in memory, and is dependent upon: intensity of stimulus, novelty, motion, size, contrast, and interestingness—BURTT, LEG. PSY., pp. 57-70.

⁴⁹BURTT, LEG. PSY., p. 81.

⁵⁰"Studying", "memorizing", "getting lessons"—are familiar examples.

witnesses study the details at the time of the incident or event, but where the fact continues to exist (a scene of accident, a boundary line, or a dangerous machine) the witness may be carried to the object or location and the important minutiae impressed upon him; courts have noted that this improves memory.⁵¹

It is now clear that "memory" is but a term, a concept, expressing a group of ideas related to a particular type of mental process. The range of memory, in its general acceptance, is from the time of recording of the perception to the time of narration, but for the purpose of studying the accuracy of memory a broader range must be examined: Faulty or defective perception originally cause many errors; equally as many are caused by the imagination of the witness and suggestions from others. Münsterberg observed that "the observation itself may be defective and illusory; wrong associations may make it imperfect; judgments may misinterpret the experience; and the suggestive influence may falsify the data of the senses."⁵² We have considered memory proper, but of defective perception or the effect of imagination and suggestion, all pertinent psychological concepts, we have as yet said little. The following comments upon these are merely suggestive and in no sense exhaustive.

The vision of so-called normal people varies greatly; all men do not see with the same degree of accuracy nor with the same speed of perception.⁵³ Witnesses often have visual defects. Hyperopia (far-sightedness) renders the witness unreliable as to events quite near and plainly discernible to normal eyes; myopia (near-sightedness) discredits the witness as to events at any distance from the defective eyes. Both of these are more prevalent than we suspect. There are other and rarer defects of refraction and restricted vision, such as anisometropia, amblyopia, hemianopsia, which might affect the credit of testimony. Whenever the witness wears glasses, or even shows the squint of eye-strain, especially if the witness is younger than advanced middle-age, it is well to determine whether the defect may account for any disparity in testimony.

Color-blindness is common enough to enter into testimony where traffic signals, color of clothes, etc., are involved.⁵⁴ Inability to dis-

⁵¹"Impressions. . . are lasting or transitory in proportion to the degree of attention. . . ."Dean v. Dean, 42 Ore. 290, 296, 70 Pac. 1039, 1041 (1902); 23 C. J. *Evid.*, § 1764, n. 91, 95.

⁵²MÜNSTERBERG, *supra.*, note 33, p. 56; BURTT, *supra.*, note 47, pp. 14, 66, 101.

⁵³Jastrow found one man saw, 100% accurately, in 8 mins. 35 secs. what another saw only 35% accurately in 9 mins. 55 secs. OSBORN, PROBLEM OF PROOF, p. 392.

⁵⁴One man in 25, one woman in 200, is color blind. BURTT, *supra.*, note 47, p. 20.

tinguish between red and green is the most common form. A simple, effective test is to have the witness choose certain colors from a box of assorted skeins of yarn. Even in normal persons colors seen from the side of the eye or in dim illumination, are rarely correctly perceived.

Acuity of vision decreases as illumination decreases; a witness recognizing minute details or colors in twilight, dim moonlight, or on a dark night should be checked carefully, as should the vision of one moving suddenly from a bright light into a dim one, and *vice versa*.⁵⁵ Much variability exists in all perceptions involving judgments, estimates and comparisons. We tend to overestimate vertical objects, lines, and distances (height of buildings, distance up hills), the size of a large object among smaller ones (a dagger among pocket knives, a large man among women), and small angles, tending to see them as right angles (collision of cars), but we tend to underestimate any filled space (a yard full of people compared with several empty yards, a single well-furnished room as compared with several empty ones) and a small object surrounded by large ones (a small woman among men); all these are revealed by experimental studies.⁵⁶

Auditory perception is best in witnesses from 7 to 18, 79.2% being able to hear ordinary conversation at 25 to 50 feet, but only 10.5% of persons over 50 could so hear, and not one in a 100 could hear it at 50 feet as against 46 out of every 100 such young people.⁵⁷ A sound directly in front, overhead, or behind a witness can not be located by the sound alone due to the equal force of the sound waves on each ear, and estimations of the distance of the sound are quite unreliable unless the sounds are very familiar and distinctly heard.⁵⁸ In feeling, the touch of a cold, smooth surface is perceived frequently as wet. On the tongue we can distinguish between two points $1/25$ inch apart, but on the thigh, a very insensitive area, we can not recognize the touch of two points unless they are $2\frac{1}{2}$ inches apart; other portions of the body show sensitivities between these extremes;⁵⁹ these facts may be of value in determining the type of weapon inflicting injury. In poisoning cases, the fact that the same substances taste differ-

⁵⁵BURTT, *supra*, note 47, pp. 23-24.

⁵⁶BURTT, *supra*, pp. 14-30; Estimates of object large enough to cover full moon, at arm's length, ranged from a pea (correct) to a carriage wheel—MÜNSTERBERG, *supra* note 33, p. 27; Notes, *infra*, (I) 22, 23, 24.

⁵⁷HANS GROSS, CRIM. PSY., (trans. by Kallen—1911), p. 187, citing Bezold.

⁵⁸An invisible tuning fork sounded was compared to a bell, a lion's growl, a steam whistle, and said to be rumbling, clear, sharp, whistling, by the various listeners. MÜNSTERBERG, *supra* note 33, p. 24.

⁵⁹BURTT, *supra* note 47, pp. 34-38.

ently in different parts of the mouth, due to the location of the various taste buds, may be of importance.⁶⁰ In cases involving whiskey, it is worthwhile to note that illusions of smell and wide variation in the acuteness of olfactory faculties are common, and that officers smell what they want to smell.⁶¹

In judgment of speed, practically every automobile wreck case produces testimonial variations of from 5% to 25% as to speed; even greater variations have been studied.⁶² The judgment of speed of motion with which one moves, in the dark or with eyes shut, is almost valueless. We observe the speed of objects across the line of vision much more accurately than speed towards us, as every bird-hunter has observed; the greater the noise the higher we are likely to judge the speed, and the higher the actual speed the smaller the percentage of error in estimating it. Extensive experience in driving cars or observing speeds make the estimates more accurate, affecting the credit and weight of the testimony.⁶³

In judging time intervals we overestimate idle intervals as compared with intervals during which we are busy,⁶⁴ but even idle intervals are poorly estimated.⁶⁵ If much happens in a short time, we overestimate the time-interval.⁶⁶ The perceptibility of objects and forces depend upon their own intensity and their background (a bright headlight may *not* be noticed in a brightly lighted street; a pistol shot may *not* be heard in a noisy factory). Estimates of numbers in a group vary from 50% below to 400% above the correct number.⁶⁷ Law has noted many of these human errors.⁶⁸

⁶⁰HUNTER, GEN. PSY., p. 239.

⁶¹HANS GROSS, *supra* note 57, p. 187 *et seq.*; CHARLES C. MOORE, TREATISE ON FACTS, (1908), Vol. I, C. VII.

⁶²The speed of a hand moving around a dial every 5 seconds was judged at from 4 inches a sec. and $\frac{1}{4}$ mile per hour (correct) and from pace of a snail or a funeral cortege to an express train or the fastest automobile, from 1 rev. per sec. to 1 rev. per 45 sec., from 7 miles to 40 miles per hour. MÜNSTERBERG, *supra* note 33, p. 23.

⁶³BURTT, *supra* note 47, pp. 37-43.

⁶⁴Unpublished experiments of author; see BURTT, *supra* note 47, p. 43.

⁶⁵Estimates of a given ten second interval varied from $\frac{1}{2}$ to 60 seconds, of a three second interval varied from $\frac{1}{2}$ to 15 seconds. MÜNSTERBERG, *supra* note 33, p. 22.

⁶⁶PORTER, THE HUMAN INTELLECT, § 565.

⁶⁷Estimates of the number of black squares on a card containing 50, ranged from 25 to 200, for one containing 20, from 10 to 70. MÜNSTERBERG, *supra* note 33, p. 20.

⁶⁸Exact and harmonious testimony as to time intervals is not expected, and if given tends to discredit the witnesses. 23 C. J., *Evid.* § 1778. The proverbial inaccuracy of evidence as to dates and time of day (23 C. J. *Evid.* § 1777) oral statements (*ibid.* § 1775), contents of written instruments (*ibid.* § 1776), and as to transactions involving a large number of dates, names, amounts, etc. (*ibid.* § 1765, n. 99).

Concerning uneducated and ignorant witnesses, McCarty insists that "the less the education and mental activity" the better the perception and memory,⁶⁹ and law recognizes the acute memories of illiterate persons in business.⁷⁰ Experimental data are lacking, but every trial lawyer has noted that elderly negroes, bright children, and illiterate tenants often are very forceful witnesses; the intelligent educated man divides his attention between perceiving and interpreting his perceptions; the greater the attention to abstract ideas, the less we perceive of facts,⁷¹ and the less we theorize, the more we can visualize.⁷²

Amnesia (forgetfulness) in old age is common, usually the least remote details being first forgotten, childhood experiences being the most persistent in memory;⁷³ as details are forgotten there is a decided tendency to fill in the gaps in memory, this paramnesia (false memory) often being so unobtrusive that it is difficult to determine the actual from the imagined, as in the case of reputation evidence as to pedigree and boundaries, and the courts have noted this tendency.⁷⁴ Adults remember many incidents of childhood,⁷⁵ the child mind being visual rather than meditative, and being alert, receptive and uncrowded is impressed by the novel and interesting character of what it perceives and witnesses; courts note this, but wisely advise the careful scrutiny of perceptions of the witness recalled from the age of seven or eight years,⁷⁶ or younger.

What memory does not recall, the imagination tends to supply—unconsciously as a rule, half-consciously where bias or suggestion exists, and consciously in whole-cloth perjury.⁷⁷ As memory fades, imagination retouches the details; where this is done unconsciously, therefore honestly, we are apt to recall what we *think* should have normally occurred, or, if personally involved, what we *wish* had occurred, or what, from suggestions now half-forgotten, we *believe*

⁶⁹MCCARTY, *supra* note 13, p. 225.

⁷⁰23 C. J. *Evid.*, § 1766.

⁷¹HANS GROSS, CRIM. PSY., p. 258.

⁷²ARNOLD, PSY. APPLIED TO LEG. EVID., p. 105.

⁷³JAMES, *supra* note 31, Vol. I, p. 661; BURTT, *supra* note 47, p. 90.

⁷⁴Courts have recognized these truths almost in their entirety. 23 C. J. *Evid.* § 1767.

⁷⁵JAMES, *supra* note 31, p. 661.

⁷⁶23 C. J. *Evid.* § 1768. G. Pfhaler (1926) and M. J. Varendonck (1911) showed that witnesses under eight to ten years, however positive, are particularly subject to suggestion and unreliable. Also see BURTT, *supra* note 47, pp. 104-105.

⁷⁷"The most frequent source of false memory is the accounts we give to others of our experiences. Such accounts we almost always make both more simple and more interesting than the truth." JAMES, *supra* note 31, p. 373.

occurred. Our courts take cognizance of this.⁷⁸ The merest skeleton of fact, repeatedly told, bodies forth as a complete, truthful narrative, "ere long fiction expels reality from memory and reigns in its stead alone"⁷⁹ and "unconscious impressions" blend with "conscious realities",⁸⁰ playing havoc with objective truth. This "filling-in" of memory occurs so unconsciously that it does not even affect the positive belief or manner of the witness.⁸¹ The nature of memory processes accomplishes this; upon recall there is a strong tendency to "sketch in missing details" and, further, the words used do not indicate the vagueness of the recollection,⁸² thus evidence "grows." Memory is more than the re-instatement of the original perception; it involves the interpretation of details, judgment, estimates, and the correlation of related incidents. Imagination and suggestion are twin-artists ever ready to retouch the fading daguerrotype of memory. Just as "Nature abhors a vacuum", the mind abhors an uncompleted picture, and paints in the details, careless indeed as to whether the old picture is reproduced faithfully.⁸³

The damaging effect of imagination is often re-inforced by the expectative factor in recall, that element which causes us to perceive (or remember that we perceived) what we expect to perceive rather than what actually occurs, a mental set for a definite situation causing

⁷⁸"The effort of the memory often supplies circumstances harmonious with the general impression of a fact or event, but which are supplied only by the imagination and the association of ideas." Choate, J. in *The Swedish Bark Adolph*, (U. S. Dist. Ct. So. Dist. N. Y.) 4 Fed. 730 (1880); *Cunningham v. Burdell*, 4 Bradf. Surr. 343 (N. Y. 1857); *West Jersey R. Co. v. Thomas*, 23 N. J. Eq. 431, 438 (1873) aff. 24 N. J. Eq. 567 (1874). "A witness may form and intensify an impression by perpetually thinking on the subject." *U. S. v. McKee*, 26 Fed. Cas. 1101 (1876); *Pierce v. Brady* (Eng.) 23 Beav. 64, 71, 53 Repr. 25 (1856). In *People v. Storrs*, 207 N. Y. 147, 100 N. E. 730 (1912) six witnesses swore they saw the document signed, yet expert and other evidence showed conclusively that it was forged. The classic example of the effect of imagination is the Twitchell murder case, in which the husband killed his wife, then went out and opened the gate to throw suspicion on some outsider. But, the servant, who was in the habit of opening the gate every morning, swore she opened it that particular morning, convicting the husband, who later confessed in detail. This case is commented upon by Wigmore (*PRIN. JUD. PROOF*, p. 259) and Wellman (*ART OF CROSS-EXAMINATION*, p. 146).

⁷⁹JAMES, *PRIN. PSY.*, Vol. I, p. 373.

⁸⁰MCCARTY, *PSY. FOR LAWYER*, p. 237 cit. SWIFT, *PSY. AND DAY'S WORK*, p. 280.

⁸¹"It is extremely easy after a short time to mix up what we imagine with what we actually recall." HOFFMAN, *PSY. AND COMMON LIFE*, p. 68.

⁸²Hutchins and Slesinger, *Some Observations on the Law of Evidence—Memory* (1928) 41 HARV. L. REV. 860, 867.

⁸³JAMES, *supra* note 31, Vol. I, p. 373.

us to mistake a similar one for the one expected—the moaning night-wind for a human cry, an innocent tramp for the escaped convict, the document presented for the one formerly attested—and the more similar the expected and the presented object the more positive and more certain the recognizer becomes,⁸⁴ but even a superficial similarity will deceive a suggestible or hysterical witness, for imagination and suggestion co-operating will re-write the perceptual truth until it is unrecognizable.⁸⁵

Witnesses vary widely in their suggestibility, from victims of hysteria⁸⁶ or hypnosis,⁸⁷ who accept unquestioningly the most absurd suggestions as true, to strong-willed individualists who not only react negatively to suggestion but tend to become antagonistic toward the suggested facts.⁸⁸ Suggestion literally “devastates memory,”⁸⁹ and its power is increased by any factor which renders the individual uncritical, submissive, and acquiescent.⁹⁰ A study of magazine advertising will reveal many factors aiding suggestion—the prestige or authority of the one making the suggestion (a noted expert), the age of the suggester (parent to child), the race of the suggester (white man to negro), the repetition or frequency of suggestion, the feeling of insignificance or one-person-out-of-many, (individual in a mob),⁹¹ which latter may be called the influence of majority opinion,⁹² and to these we should add self-interest, and bias.

Cross-examination offers an often-ignored opportunity to discover the effect of suggestion—whether the witness has been coached, is a

⁸⁴“The deceptive certainty of the recognizer increases with the similarity to the original material.” LUND, *The Criteria of Confidence*, 37 AMERICAN J. PSY. 372. Six familiar pictures of white children were picked from pictures of horses, houses, or negroes with accuracy up to 80% and 85%, from pictures of other white children with 50% accuracy, and from pictures of similar white children with less than 20% accuracy. FEINGOLD, *Recognition and Discrimination*, PSY. MON. (1915), No. 78.

⁸⁵Hans Gross notes, “It is difficult to believe how far the imagination of the emotional, though highly intellectual, persons will carry them.” CRIM. INVESTIGATION, (Adam Trans.) pp. 77-90.

⁸⁶HERZOG, MED. JURISPRUD., § 386.

⁸⁷GATES, ELEM. PSY., p. 394; WOODWORTH, PSY. A STUDY OF MENT. LIFE, p. 547.

⁸⁸ARNOLD, PSY. APPLIED TO LEG. EVID., p. 468.

⁸⁹“One factor more than anything else devastates memory and plays havoc with our best intended recollections: that is the power of suggestion.” MÜNSTERBERG, *supra* note 33, p. 67.

⁹⁰HUNTER, GEN. PSY., p. 109.

⁹¹E. A. ROSS, SOCIAL PSY., cited in HUNTER, GEN. PSY., p. 109.

⁹²H. T. MOORE, *The Comparative Influence of Majority and Expert Opinion*, (1921) 32 AM. J. PSY. 16.

victim of constant, subtle suggestion, and whether the witness is an unusually suggestible person.⁹³ Children up to the age of puberty are extremely suggestible,⁹⁴ as are illiterate negroes and feebleminded or hysteric persons,⁹⁵ and their testimony may be the result of suggestions made often in their presence by their superiors, or of their vagueness as to the difference between imagination and actuality, or even of the suggestions embodied in, or implied by, the examiner's questions.⁹⁶ The medicine show, the oil-stock salesman, carefully dressed show-windows, billboards and magazines, the fervid evangelist, the witty auctioneer, the impassioned trial lawyer—all are convincing evidence of the power of suggestion to make men alter their conceptions of facts and change their opinions.⁹⁷

Leading questions, as the law has long recognized, by their suggestiveness encourage errors; Whipple found mildly suggestive questions increased error 10%, strongly suggestive ones, 33% (total error 61%).⁹⁸ Burt has carefully checked the work of Muscio in this field,⁹⁹ finding that the negative-objective form of question is the

⁹³Suggested tests of suggestibility: In rapid sequence present eight cards having right and left line equal, followed by five cards on which one is slightly longer, having witness call after each whether they are equal. A suggestible witness will by his mental set for equal lengths commit errors in two or more of the last five before he catches his error. Present to witness card having ten lines, each slightly longer than its predecessor, except the last three are same length. Have him copy these; a suggestible witness usually draws each line throughout longer than the preceding line. Present a cartoon containing some details, and after witness has examined it, take it from him and question him as to details, finally asking in negative-objective form about some detail which might have been but was not in the picture—"Wasn't there a small dog with the child?" A suggestible witness will agree that there was.

⁹⁴GUY M. WHIPPLE, *MANUAL OF MENT. AND PHY. TESTS*, (1910) p. 286 *et seq.*

⁹⁵BURT, *supra* note 47, pp. 109-115.

⁹⁶"Create, if you will, an idea of what the child is to hear and see, and the child is very likely to see or hear what you desire. He can so lead the child by indirect suggestion that the evidence will be wholly false and unreliable." BROWN, *LEG. PSY.*, p. 133. To same effect: McCARTY, *supra* note 13, p. 270; ROSS, *supra* note 91, p. 15.

⁹⁷"Many a man thinks he makes up his mind, whereas, in truth, it is made up for him by some masterful associate who talked with him last." ROSS, *supra* note 91, p. 12. "Suggestions are true forces and enact themselves unless they meet resistance." ROSS, p. 13.

⁹⁸Whipple found an average error of 38% for mildly suggestive questions, 61% for strongly suggestive ones, as compared with 28% error for non-suggestive questions. *The Obtaining of Information* (1918) 15 *PSY. BULLETIN*, 245.

⁹⁹Muscio's work in this field (B. Muscio, *The Influence of the Form of Question*, (1915) 8 *BRIT. J. PSY.* 551 *et seq.*)

most suggestive.¹⁰⁰ Questions in double and triple negative are productive of high error, the triple negative, "abolishing law abolishing prohibition," more than half the time eliciting an answer opposite from that intended by the witness.¹⁰¹

Does the interrogatory or the narrative method produce the more accurate testimony? Why not abolish the least effective? Here we have clear-cut answers. Forced memory (answers to questions) is less accurate than natural recall (free narration), but the interrogatory covers a much greater range and brings out much information that the narrative does not yield, the increase in range bringing a resulting loss in accuracy due to the "forcing" of the memory.¹⁰² According to Whipple, about 1/10 of a narrative is inaccurate, about 1/4 of a deposition, while 2% of the narratives are errorless and only 0.5% of the depositions.¹⁰³ Marston's excellent work¹⁰⁴ seems to settle finally these questions: He found narrative the most accurate and least complete of all forms; direct examination is 11% less accurate, 9% more complete than narrative, while cross-examination is 18% less accurate than narrative and 7% less accurate than direct examination but only 2% less complete than direct examination and 6% more complete than narrative, and, finally, there is a close correlation between caution and both completeness and accuracy. His finding of great caution on cross-examination is elementary to trial lawyers. After warning witnesses that they would be tested, he repeated the experiment using different material; this time he found, as a result of the forewarning, completeness was improved 6%, but

¹⁰⁰BURT (LEGAL PSY. pp. 122-130) indicated that "a" as compared with "the" is about equally suggestive, that the negative ("not a") is more suggestive than the positive ("a") form of question, that the objective ("was there") is more suggestive than the subjective ("did you see"), and that the negative-objective form ("Wasn't there a . . .?") is the most suggestive form of all these questions.

¹⁰¹E. E. Wembridge and E. R. Means, *Voting on the Double Negative* (1918) 2 J. APPLIED PSY. 156-163.

¹⁰²H. M. CADY, *On the Psychology of Testimony* (1924) 35 AMERICAN J. PSY. 110, experimentally proved that the best results are obtained by narrative with supplemental questioning.

¹⁰³GUY M. WHIPPLE, *MANUAL OF MENT. AND PHY. TESTS*, (1910), p. 286 *et seq.*

¹⁰⁴Marston, in a carefully planned and controlled experiment, enacted an incident before a group, then had them write out narratives of what occurred, later quietly examining them, then vigorously cross-examining them. The averages were: For narrative, 23% completeness, 31% on direct examination, and 29% completeness on cross-examination; for accuracy, 94% for narrative, 83% for direct examination, and 76% for cross-examination; for caution (tested by the number of "don't know" answers), 40% for direct examination and 52% for cross-examination. W. M. Marston, *Studies in Testimony* (1924) 15 J. CRIM. LAW AND CRIMINOLOGY 1-31.

accuracy decreased 8%, caution decreased 32%. Since most witnesses in court are not forewarned as to the events or that they will be called, this second test is of little practical value to lawyers.

The form of the question is itself suggestive, as it may as frequently suggest the wrong, as the right, answer,¹⁰⁵ unless the examiner applies to the questioning a keen insight into the principles of suggestion. Except with sub-normal minds—children, hysterical and hypnotized persons, with whom the more direct the suggestion the readier the acceptance—the more indirect, disarming and adroit the suggestion the more effective it is, as the witness will defend his statements aggressively in the same proportion that he is unconscious that they result from suggestion.¹⁰⁶ Every experienced lawyer knows instances proving the power of suggestion to alter and to create testimony; Swift and McCarty describe several cases in point; courts have fully discussed this.¹⁰⁷

Bias has much the same effect as suggestion and probably affects more testimony;¹⁰⁸ certainly its characteristic aspects have received careful attention in the reported decisions.¹⁰⁹ "We easily believe

¹⁰⁵SWIFT, *PSY. AND DAY'S WORK*, p. 284, citing Kuhlman in *AM. J. PSY.* Vol. XVI, p. 395.

¹⁰⁶GRIFFITH, *GEN. INTROD. PSY.*, p. 336; ROSS, *SOCIAL PSY.*, pp. 27, 19-21; MCCARTY, *PSY. FOR LAWYER*, p. 273.

¹⁰⁷MCCARTY, *supra* note 106, pp. 279-289; SWIFT, *supra* note 105, pp. 273-289. Both describe the Jester case, in which witnesses, children and strangers at the time, described the incident of Jester driving past in a snowstorm, giving full minute details, thirty years afterward. Shipman, J. in *Hershey v. Blakesley*, 33 Fed. 922, 924 (1888) remarks that courts, "are fully aware of the ease with which honest witnesses can persuade themselves that they remember some bygone circumstance. . . ." "We repeat events until we are ready to swear, in utmost sincerity, that we are spectators of their occurrence." Miller v. Cotten, 5 Ga. 341, 349 (1848). "It is a very common thing for an honest witness to confuse his recollection of what he actually observed with what he has persuaded himself to have happened. . . ." *In re Wool*, 36 Mich. 298, 302 (1877). What we read and hear cause this illusion (*Parker v. Hulne*, 18 Fed. Cas. 108, 1 Fish. Pat. Cas. 44 (1849)), especially in reproducing conversations where the "danger is that, even a conscientious person, in trying to narrate a transaction which exists in his memory in a faded or fragmentary state, will in his effort to make the reproduction seem complete and natural, substitute fancy for fact, or fabricate the missing or forgotten links." (*Hodge v. Amerman*, 40 N. J. Eq. 99, 103, 3 Atl. 257 (1885)).

¹⁰⁸"An unprejudiced individual does not exist," according to Dr. William Allen White, *Expert Testimony in Proceedings Involving Questions of the Mental State of the Defendant* (1921) 11 J. CRIM. L. AND CRIMINOLOGY, 499. "Suggestions of idle or of designing persons get to be mixed up with the recollections, which become fainter and fainter, till at last their own fancy helps to mislead them. . . ." *McGregor v. Topham*, (Eng.) 3 H. L. Cas. 132, 149, 10 Rep. 51 (1850).

¹⁰⁹"The bias of a witness has a well known and pernicious influence in quickening or deadening his memory, and much allowance is made therefor in weighing his testimony." 23 C. J., *Evid.* § 1772, cit. 81 cases.

what we wish to be true,¹¹⁰ is good psychology and sound law. Pronounced bias produces perjury, but honest bias tends to intrude upon and pervert recall increasingly as actual recall grows vague. We tend to recall what we want to recall,¹¹¹ especially when we are uncertain of the true facts. Bias may be the deciding factor in filling the gaps in memory, as when the owner of the car which, left running, has injured someone, recalls positively that he stopped the car, cut off the switch, set the brakes, etc. Personal interest facilitates the recall of the desired and congenial, represses the unwanted and distasteful.¹¹² Our system of cross-examination assumes, correctly, that bias of prejudice and sympathy are valuable allies and dangerous opponents. Unconscious bias is more dangerous than conscious bias.¹¹³ In every witness there is "an empire of subconscious loyalties," likes and dislikes, preferences and hatreds, some conscious, others unconscious, but all entering into and affecting what we perceive, how we perceive it, and, most important of all, how we recall it.¹¹⁴

Two pertinent topics demand comment at this point: The maxim *falsus in uno, falsus in omnibus*, and "testing memory" on cross-examination; the first allows the jury upon finding a witness guilty of one inaccuracy to discard all the evidence of that witness,¹¹⁵ the second permits, under the present practice, rambling, purposeless cross-examination. Of the maxim, Wigmore's statement, "Repeated instances of inability to recollect give the right to doubt the correctness of an alleged recollection,"¹¹⁶ is true only when the instances are akin to, or similar to, the fact questioned.¹¹⁷ No correlation exists between the types of memory in the same person; a good memory for names may be a poor one for ideas, and the improvement

¹¹⁰Turner v. Hand, 24 Fed. Cas. No. 14, 257, 3 Wall Jr. 88 (1855).

¹¹¹BURTT, LEG. PSY., p. 93.

¹¹²Discussion and study of a case "merge the vague with the certain, the imaginary with the real, the desired with the actual." McCARTY, PSY. FOR LAWYER, p. 219.

¹¹³Barker, J. in Hargis v. Commonwealth, 135 Ky. 578 (1909).

¹¹⁴"We may try to see things as objectively as we please. None the less, we can never see them with any eyes except our own," Justice Cardozo has well said. THE NATURE OF THE JUDICIAL PROCESS, p. 12. Recollection is shaped by interest: Miller v. Cohen, 173 Pa. 488, 494, 34 Atl. 219 (1896); Pierce v. Feagans, 39 Fed. 587, 590 (1889); Smith v. Smith, 48 N. J. Eq. 566, 585, 25 Atl. 11 (1891); Sunday v. Gordon, 23 Fed. Cas. 408, Blatchf. & H. 569, 576 (1837).

¹¹⁵28 R. C. L. Witnesses § 244.

¹¹⁶WIGMORE, EVIDENCE, Vol. II, Sect. 995; 40 Cyc. Witnesses § 2586-2591.

¹¹⁷"Inquiry into ability to recall dissimilar items is unprofitable and misleading." Hutchins, R. W. and Slesinger, D., *Some Observations on the Law of Evidence* (1928) 41 HARV. L. REV. at p. 870.

of one does not improve the other.¹¹⁸ A nearsighted witness may have a keen perception of odor or sound; a poor judge of speed may describe exactly the position of the car after the wreck. We have memories, not *a* memory;¹¹⁹ Münsterberg suggests three major types of memory: Visual, accoustical, and motor, none of which is correlated with any other.¹²⁰ An artist may vividly describe a view, a musician exactly a sound, and an airplane pilot correctly a particular feeling; yet for other types of perception each may be very inaccurate. Our juries rarely know or are told this; hence, they ignore the pompous Latin phrase, or follow it blindly as the wisdom of the ages, either course being equally unfair to the witness and the party calling him. In the "testing of memory", judges could save time and aid justice by restricting the questions to those which test the *particular type* of memory which is under impeachment; courts should recognize that memory is not an entity, and should recognize that one part may be accurate, another inaccurate.¹²¹ An enlightened discretion of the trial judge will prevent questions impeaching hearing being asked as to sight, taste, or feeling, *vice versa*.

No study of memory of witnesses can ignore the so-called "dramatic experiments",¹²² in which groups assembled for another purpose, are confronted suddenly with a planned dispute or fight, acted or in moving pictures, immediately after which the witnesses write out descriptions or answer questions as to what took place. Sutherland's

¹¹⁸The recall of names, faces, words, or ideas have no correlation. Achilles, *Experimental Studies in Recall and Recognition* (1920), ARCHIVES. PSY. No. 44. Memory for nonsense improved, does not improve memory for prose or poetry. Sleight, *Memory and Formal Training* 4 BRIT. J. PSY. 386.

¹¹⁹Davies, *Professor Titchener's Theory of Memory and Imagination* (1912), 19 PSY. REV. p. 147. ¹²⁰MÜNSTERBERG, *supra* note 33, p. 61.

¹²¹Hutchins and Slesinger have pointed out that the law still accepts the obsolete and discredited "faculty psychology", which assumed that memory is an entity, and that a particular person's memory is either accurate as to all or inaccurate as to all. *Some Observations on the Law of Evidence—Memory* (1928) 41 HARV. L. REV. p. 860.

¹²²Von Liszt, University of Berlin, made one of the earliest of these tests; he found 26% to 80% errors in the reports, many important details completely changed; the last half of the experiment, being strongly emotional, revealed 15% more errors than the first half. MÜNSTERBERG, *supra* note 33, p. 50; SWIFT, *supra* note 105, p. 303; MCCARTY, *supra* note 13, p. 207; L. W. Stern, *Zur Psychologie der Aussage*, 12 L'ANNEE PSYCHOLOGIQUE 182. Of 40 professional men, Gates found 13 omitted 50% important facts, the other 27 from 20% to 50%, and that 5% to 50% of the facts they were willing to swear to were erroneous. ELEM. PSY. p. 2-5. In other tests 10% to 40% of the questions were not answered, and those answered were wrong in 8% to 50% of the instances. GATES, PSY. FOR STUD. EDUC., 2-3.

are representative findings: A general érror, under the most favorable conditions, of 25%, estimates of the man's height, for example, varying from "four feet" to "six feet six inches."¹²³ Burttt found ¼ omitted 50% of the details, that the average omission was 40%, even when warned beforehand, and that the average description of a person overestimated height 5 inches, missed the age 8 years, and could not give an approximation of the hair color in 83% of the instances.¹²⁴ Dean Wigmore suggested that judges and juries were more accurate than the witnesses they relied upon, and suggested this be tested,¹²⁵ experiments indicate that he was correct.¹²⁶ How close these experiments indicate the general error of witnesses, judges, or jurors, in actual trials, we can only surmise. Studies of the effect of the oath, indicate that it reduces error and increases caution; according to Stern there are 1.82 times the errors in unsworn as in sworn testimony, 1.89 times according to Borst, 1.8 according to Brown, 8% to 9% greater error according to Boring.¹²⁷ It seems probable that verdicts and judgments approach the truth much more closely than

¹²³SUTHERLAND, CRIMINOLOGY, p. 271.

¹²⁴BURTT, LEG. PSY., p. 15. The following are illustrative of the many "dramatic experiments": McKeever, W. A., *Psychology in Relation to Testimony* KANSAS BAR ASS'N. PROC. (1911) p. 113. GRIFFITH, GEN. INTROD. PSY., p. 407; DOCKERY GEN. PSY., p. 63. SWIFT, PSY. AND DAY'S WORK, p. 291; MÜNSTERBERG, ON WITNESS STAND, p. 49. ARNO, GUNTENER, DRAMATIC INCIDENT, p. 583; WIGMORE, PRIN. OF JUDICIAL PROOF, p. 581, (2nd Ed. 1931) p. 540.

¹²⁵*The Psychology of Testimony*, (1909) 3 ILL. L. REV. 426; PRIN. JUD. PROOF, p. 591.

¹²⁶Radbruch found the judges were substantially correct, though the nine witnesses made the usual errors. Zavadski found judges unanimously avoided the grossest errors, with average of 20.6% error as against 27% for witnesses, each judge picking as most accurate the witness actually most accurate. Detmold found that in spite of witness' errors a composite picture substantially correct could be formed. Guntener found two judges 100% in identification though the identifying witnesses were 80.6% in error, and that the judges were 87.4%, 90.6%, respectively, correct as to all findings as compared with 79.9% for the witnesses on which they relied. Wigmore, *The Psychology of Testimony* (1909) 3 ILL. L. REV., 426. Marston *Studies in Testimony* 15 J. CRIM. L. AND CRIMINOLOGY 5-31 found judges both more complete and more accurate than the juries, that female juries are more accurate than male juries but less accurate than judges, and that juries are 3.4% more complete and 2.6% less accurate than the average of the witnesses relied upon.

¹²⁷WHIPPLE, MANUAL OF MENT. AND PHY. TESTS, p. 286 *et seq.* According to Burttt (LEG. PSY. p. 153) in one study 20% to 25% error became only 10% under oath; another showed 92% accuracy under oath, 86% where witness felt assurance of truth, and 56% where witness believed but was not willing to commit himself. Boring (6 AM. INST. CRIM. LAW (1916) 820) found sworn more accurate than unsworn as follows: Women, 8%; men, 9%; girls, 15%; boys, 13%. See BROWN, LEG. PSY., (1926), p. 73.

hasty conclusions from the experiments would indicate; certainly judges and jurors apply a certain amount of intuitive knowledge of human nature, often "feeling out" the truth beyond the record evidence, and judgments and verdicts speak accordingly.

This study of memory has indicated to trial lawyers that faulty memory may be attacked most effectively along three distinct lines: (1) The original perception of the event or detail may have been defective; (2) the details may not have been fixated, may have been forgotten, or imagination may have altered, added to, or changed them; (3) the original perception may have become interwoven with or altered by suggestion from outside sources. Tests directed at the perception of the witness, his retentiveness, imagination, caution, bias, and suggestibility will be most fruitful. The important questions to consider concerning his memory are: Did he perceive as he now recalls it? Has his memory retained, without addition or subtraction, the original perception? Does imagination, bias or suggestion color his present recollection?

Memory, however faulty, can not be amended or abolished; it must continue to furnish the grist from which our tribunals (crude, clumsy, obsolete though they be) grind the fine meal of truth. The scales of justice, wrought in the age of bronze, hang streaked with the canker of feudalism and enmeshed in the cobwebs of pioneer tradition, but the battered balance pans, ever-adjusted by a bar and judiciary alert to the cumulative findings of science, may still weigh out impartial justice. Lawyers, judges and jurors are "called upon to act as amateur psychologists,"¹²⁸ and "if courts will open their minds to the realization that science can be applied to the judgment of testimonial credit, regardless of the rules arising before the days of modern science, they will readily follow a liberal practice."¹²⁹ A constant study of the weakness and strength of memory, its reliability in certain particulars and under certain conditions, and the effect of the various factors acting upon it, as revealed to us from time to time by psychology, will eventually enable us to evaluate properly the testimony of witnesses and thereby render more effective the eternal striving of our courts to approximate absolute justice in each individual case.

¹²⁸CHAMBERLAYNE, EVIDENCE, Vol. III, § 1774, n. 10.

¹²⁹WIGMORE, EVIDENCE, Vol. II, § 990.