

**STRUCTURING DISCRETIONARY JUDICIAL
DECISION MAKING: A PROBABILISTIC
APPROACH TOWARD THE
DETERMINATION
OF SALVAGE AWARDS**

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Discretionary judicial decision making is an undecided transexual, for it has been claimed to be the very catalyst transforming injustice into justice. Yet, this same discretionary decision making has been damned as the very cause of injustice; therein lies the deep-rooted problem. This very ambivalence is inherent in the nature of discretion.

This article is concerned with constraining and structuring discretion rather than eliminating it. Although discretionary power can be “dangerous and harmful,”¹ it is a necessary governmental tool. “What is obviously needed is balance—discretionary power which is neither excessive nor inadequate.”² This article’s specific concern is with the discretionary judicial process rather than the end result of a given situation. Discretion is analogous to a judicial “black box”³ where factual situations are inserted into the box and decisions are taken out. Yet, this process does not explain the conversion of facts into decisions. While discretion opts for vagueness, arbitrariness and generalization, rules and guidelines opt for clarity, certitude, and specificity. Discretion is not inherently malignant and as an alternative to its elimination Davis has suggested that

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1. K. DAVIS, DISCRETIONARY JUSTICE: A PRELIMINARY INQUIRY 27 (1971).

2. *Id.*

3. The “black box” is a basic concept of motivational behavior whereby input, or stimuli, and output, or results, are totally visible. Yet, the individual’s mental processes occurring “between inputs and outputs are forever hidden from view.” J. ENGLE, D. KOLLAT & R. BLACKWELL, CONSUMER BEHAVIOR 22 (1973). Any explanation of what intervened between the input and output can be only inferential.

discretion be confined, checked, and structured.⁴ This article's focus is directed at the structuring of discretion rather than at its elimination.

At first glance the structuring of judicial discretion appears to be an attempt to harness the unharnessable or to control the uncontrollable. Despite this obvious conceptual chasm, Davis declares that structuring discretion "means regularizing it, organizing it, and producing order in it, so that decisions will achieve a higher quality of justice."⁵ Structuring is "controlling the manner of the exercise of discretionary power within designated parameters."⁶ Further perceptive observation indicates that the key weapon to curb the unbridled exercise of discretion is "openness." This is so because openness "is the natural enemy of arbitrariness (excessive or uncontrolled discretion), and a natural ally in the fight against injustice."⁷ According to Davis, "openness" includes an arsenal of plans, policy statements, rules, findings, and precedents.⁸ Davis' system of "openness," however, de-energizes because he fails to truly operationalize either his concept or his arsenal of "openness."

This article advocates the structuring of discretion "so that judicial decisions will achieve a high quality of justice."⁹ Achieving this high standard of justice requires an operational pursuit within a specific forum. Thus, this article will pursue the regularization and organization of judicial decisions within the explicit forum of salvage award determinations. The method chosen to regularize and organize judicial decisions in salvage award cases is modern behavioral science decision theory. This theory applies the scientific method by utilizing the decision technique of statistics or probability theory. The selection of this method is primarily based upon: 1) the fact that law in general, and judicial decision making specifically, forms one of the behavioral decision sciences and therefore must be recognized, accepted, and analyzed as such; 2) the fact that case law demands the conceptualization of behavioral science decision analysis, probability theory, and the strict application of the same;¹⁰ and 3) the fact that there is a burgeoning need

4. K. DAVIS, *supra* note 1, at 27.

5. *Id.* at 94.

6. *Id.* at 93.

7. *Id.* at 226.

8. *Id.* at 93.

9. *Id.* at 94.

10. See notes 40 and 42 *infra*, and accompanying text.

for the actual usage of quantitative analysis in the law.¹¹ Before applying this type of analysis, the recent history of quantitative methodology in the law must be discussed.

I. MODERN DECISION THEORY AND THE LAW

Louis Brandeis was one of the earliest proponents of empiricism in the law. His *Muller v. Oregon*¹² brief relied more on economic, social, and medical data than legal argument to demonstrate the harmful effects of long working hours on women. Felix Frankfurter later noted the Brandeis brief as “epoch-making”¹³ and stated:

There should be much flexibility as to method Freely we must utilize *all* the allies there are—statistics, history, anthropology, psychology. But let us beware of their limitations and partially your own.¹⁴

Brandeis¹⁵ and Frankfurter have not been alone in their appeals for and prediction of empiricism and the law. Such renowned legal jurists as Cardozo,¹⁶ Hand,¹⁷ Holmes,¹⁸ and Pound¹⁹ have recognized the need for the usage of empiricism or the scientific method in the law.

With the perceived need, demand, and predicted usage of empiricism in the law firmly rooted, the issue becomes whether this need, demand, and prediction have been fulfilled. A meaningful response requires that one view the record of empiricism and the law. An overview of this record has discovered that:

- 1) the need for efficient and effective judicial administration has led to a growing number of studies and data collection procedures,²⁰

11. See notes 106 and 42 *infra*, and accompanying text.

12. 208 U.S. 412 (1908).

13. Frankfurter, *Hours of Labor and Realism in Constitutional Law*, 29 HARV. L. REV. 353, 365 (1916).

14. Frankfurter, *The Conditions for, and the Aims and Methods of, Legal Research*, 15 IOWA L. REV. 129, 139-40 (1930).

15. A. MASON, *BRANDEIS: LAWYER AND JUDGE IN THE MODERN STATE* 102, 107 (1933).

16. B. CARDOZO, *THE NATURE OF THE JUDICIAL PROCESS* 66-97 (1921).

17. *United States v. Carroll Towing Co.*, 159 F.2d 169 (2d Cir. 1947).

18. O. HOLMES, *THE COMMON LAW* (1881).

19. R. POUND, *JURISPRUDENCE* (1959).

20. H. ZEISEL, H. KALVEN & H. BUCHHOLZ, *DELAY IN THE COURT* (1959); M. ROSENBERG, *THE PRETRIAL CONFERENCE AND EFFECTIVE JUSTICE* (1964); and A. VANDERBILT, *THE CHALLENGE OF LAW REFORM* (1955).

- 2) in the 1930's, criminologists began to employ quantitative methods for comparing positive and normative models of criminal behavior;²¹
- 3) after World War II, sociologists began to apply empirical devices to the analysis of law formation impact on the people and the law profession's composition;²²
- 4) in the late 1950's, judicial behaviorists started to apply quantitative techniques when exploring the various factors affecting judicial decisions. Predicting judicial behavior is an inherent part of this analysis;²³
- 5) empirical studies pertaining to various segments of the United States legal system were pursued. Kalven and Zeisel's study of *The American Jury*²⁴ and the American Bar Foundation study of *The Legal Needs of the Public*²⁵ are examples of such empirical studies;
- 6) statistics have been used extensively in civil rights litigation, particularly in the area of voting rights and employment discrimination;²⁶
- 7) statistics have been utilized in antitrust cases when establishing relevant market data and defendants share²⁷ thereof, market surveys in deceptive advertising,²⁸ and trademark infringement cases.²⁹ Statistics also have been used in personal injury and wrongful death actions.³⁰

Despite the aforementioned usage of empiricism in the law, in 1963, Nagel³¹ recognized the embryonic stage of empiricism in the law when he predicted that twentieth century scientific methodology, which had engulfed and rejuvenated the social sciences, soon would do the same for the law. Nagel said that

21. BURROW, *Crime and Social Reaction of Right and Wrong: A Study in Clinical Sociology*, 24 J. AM. INST. CRIM. L. & CRIMINOLOGY 685 (1934).

22. J. CARLIN, *LAWYERS ON THEIR OWN* viii-ix, 212-23 (1962).

23. LOVEVINGER, *Jurimetrics: The Methodology of Legal Inquiry*, 28 LAW & CONTEMP. PROB. 5 (1963).

24. H. KALVEN & H. ZEISEL, *THE AMERICAN JURY* (1966).

25. B. CURRAN & F. SPALDING, *THE LEGAL NEEDS OF THE PUBLIC* (1974).

26. DAWSON, *Probabilities and Prejudice in Establishing Statistical Inferences*, 13 JURIMETRICS 191, 196-99 (1973).

27. *Bristol-Myers Co. v. F.T.C.*, 185 F.2d 58 (4th Cir. 1950).

28. BERNACCHI, *Advertising and Its Discretionary Control by the FTC: A Need for Empirically Based Criteria*, 52 J. URB. L. 223, 248-99 (1974).

29. *See, e.g., Anheuser-Busch, Inc. v. Bavarian Brewing Co.*, 264 F.2d 88 (6th Cir. 1959); *Aloc Creme Laboratories, Inc. v. Milsan, Inc.*, 423 F.2d 845 (5th Cir. 1970).

30. *O'Connor v. United States*, 269 F.2d 578 (2d Cir. 1959).

31. Nagel, *Testing Empirical Generalizations in Legal Research*, 15 J. LEGAL EDUC. 365 (1963).

[t]he twentieth century has been witnessing a methodological revolution in the social sciences. Psychology, which is partly a biological science, was the first social science affected, then sociology succumbed. Then, economics. Since the end of World War II, political science has been undergoing a methodological rejuvenation. Its close neighbor, the field of law, seems next in line.³²

In the same vein, Rosenberg, in 1968, expressed further optimism about the likelihood of using scientific research in the law when he said that legal research “*will* ground its findings in data and *will* . . . also go outside the library to the field. It *will* insist that hunch and speculation be complemented as much as practicable by carefully gathered data.”³³

The point is that, while definite progress has been made toward the interaction of law and empiricism, the field of law has been slower in adopting empiricism than any of the other social sciences. The problem is inherent in traditional legal analysis because lawyers insist upon relying on individual cases and precedents for rules of law to determine court decision patterns. Unquestionably, “[t]he [r]evolution [has been] [d]eferred”³⁴ because most lawyers are neither schooled in the rigorous scientific method discipline, nor do they totally accept the legality and ethics associated with the discipline. Nagel has pointed succinctly to the problem by stating:

Legal scholars have long been concerned almost exclusively with individual cases, chronologies of precedent development, armchair speculation . . . and especially descriptions of the holdings in sets of [individualized] judicial opinions.³⁵

In essence, the individualized case method which emphasizes dissimilarity rather than similarity is the antithesis of the scientific method. The case method stresses disaggregation which seriously impedes any meaningful aggregation into theory. On the other hand, the scientific method is grounded in the proposition that the “basic aim of science *is* theory,”³⁶ which stresses “explanation, understanding, prediction and control,”³⁷ rather than rational devel-

32. *Id.* at 381.

33. W. MEYER, DOLLARS, DELAY AND THE AUTOMOBILE VICTIM (1968) (*see forward* by M. Rosenberg at iv) (emphasis added).

34. Gazell, *The Revolution Deferred: Researching the Law*, 22 UTAH L. REV. 23 (1972).

35. Nagel, *supra* note 31, at 381.

36. F. KERLINGER, FOUNDATIONS OF BEHAVIORAL SCIENCE RESEARCH: EDUCATIONAL, PSYCHOLOGICAL, AND SOCIOLOGICAL INQUIRY 8 (2d ed. 1973) (emphasis added).

37. *Id.* at 9.

opment with its high level of risk and uncertainty.

It should be noted that the scientific method receives its vitality from information. Techniques for discovering, gathering, and analyzing information are the very essence of the scientific method and the increased quantity and quality of information³⁸ generates Davis' desired state of "openness."³⁹ Thus, a greater amount of correct information creates a greater openness which is needed for the structuring of discretion. Correspondingly, limited information results in less openness and less structuring of discretion.

II. HAND'S CALCULUS HERITAGE: A DEMAND FOR THE STANDARD OF PROBABILITY

Perhaps the most renowned and perceptive demand for probability theory analysis was presented by Judge Learned Hand in his classic *United States v. Carrol Towing Co.*⁴⁰ opinion. In an attempt to determine the liability of a vessel that had injured another vessel, Hand said:

Since there are occasions when every vessel will break from her moorings, and since, if she does, she becomes a menace to those about her; the owner's duty, as in other similar situations, to provide against resulting injuries is a function of three variables: (1) The probability that she will break away; (2) [T]he gravity of the resulting injury, if she does; (3) The burden of adequate precautions. Possibly it serves to bring the notion into relief to state it in algebraic terms: if the probability be called P; the injury L; and the burden, B; liability depends upon whether B is less than L multiplied by P: i.e., whether B is less than PL. Applied to the situation at bar, the likelihood that a barge will break from her fasts and the damage she will do, vary with the place and time⁴¹

In essence, Hand stated that the determination of the injuring vessel's duty to provide against resulting injuries is dependent upon three major independent variables. The relationship can be listed symbolically as:

D f(P, L, and B)

Dependent Variable:

D = Duty to provide against resulting injury

Independent Variables:

38. See note 105 *infra*.

39. See notes 7 and 8 *supra*.

40. 159 F.2d 169 (2d Cir. 1947).

41. *Id.* at 173.

- 1) P = Probability that the injuring vessel will break away;
- 2) L = The gravity of resulting injury if the vessel does break away; and
- 3) B = The burden of adequate precautions by the injuring vessel's owner.

Hand asserts that the three independent variables have a precise relationship that determines the existence of the duty and the ensuing liability. That is, the equilibrium point of duty and liability determination is when $B = P \times L$. Therefore, liability exists when B is less than $P \times L$ and no liability exists when B is greater than $P \times L$.

Judge Hand modestly prefaced his algebraic expression in *Carroll* by stating that "possibly it serves to bring this notion [liability determination] into relief to state it in algebraic terms."⁴² His

42. *Id.* This statement must be viewed as the operationalization of Hand's "calculus." Simply stated, Hand's "calculus" demands specific implementation. Hand's suggestion to implement probability theory was a call for subjective probability. Probability theory may be viewed as comprised of two major classification schemes—objective and subjective theory. Objective probability theory is based on objective sample data, while subjective probability theory is based on subjective evaluations.

Without being encumbered by the strict operational mechanics of these two major branches of statistical decision theory, suffice it to say that, analytically, they are distinguishable because of their different sources of information. Classical decision theory is predicated upon sampling theory or sample evidence. Data, therefore, is gathered from a sample that is deemed representative of the larger unit from which that sample was chosen. All estimates and predictions, therefore, are based on information gathered about the sample and then imputed to the universe. On the other hand, subjective decision theory is predicated on non-sample evidence or information. Subjective statistics recognize the need for and value of non-sample information in decision making where no sample data are available. Essentially, subjective probability places a high value on the mere existence of information to be put into the weighing of alternatives by the decision maker. Subjective statistics enable the decision maker, who does not have objectively precise sample data available to him, to lessen his decision uncertainty. This is accomplished by permitting him to weigh, evaluate, and utilize whatever information and experience he has available to him.

While the success of this approach rests upon the decision maker's perspicacity and insight when evaluating and using his other information and experience, nevertheless, it enables him to reduce the risk of uncertainty when alternative decisions are available.

One other valuable feature of subjective probability is its adaptability. As objective sample data are collected and made available, subjective decision theory enables the revision of the decision maker's estimates to reflect the objective sample data.

In the face of an uncertain decision and no objective sample data, Learned Hand obviously has demanded that subjective evaluations be attached to his independent variables with the decision of liability based on the equilibrium point of his independent variables ($B = P \times L$). Hand's "calculus" demands that those who determine the vessel's liability bring their best judgment to bear, using both their common sense and experience, to determine in a quantitative manner the weight to be given each independent variable. In this manner it can be determined whether the injuring vessel has any liability.

It also should be recognized that the degree of liability, based on the degree of duty, is ascertainable given the necessity or desire of determining the degree of disequilibrium when $B \neq PL$.

conceptual framework requires that the independent variables be assigned quantum meaning through the use of mathematical probability theory. The denial of Hand's "calculus" as being anything but a probabilistic standard is an absurdity that is consistent with the legal system's tardiness in fully accepting the scientific method with its attendant empirical techniques. While Hand's formularization has been accepted as a very perceptive conceptual shorthand for determining legal liability, it has been totally ignored by legal analysts as a formula for yielding specific and predictable outcomes. This observation becomes even more curious when one realizes that it is precisely this type of analysis that would encourage the law to consistently produce a high level of open and well-reasoned determinations.

The best stage for applying statistics and probability theory to the law is in the area of salvage award determinations. On the one hand, salvage award determinations are generally smitten with the use of excessive judicial discretion, while on the other hand, such determinations have specific, generally accepted, and well-defined criteria for rendering a scientific determination.

Once Hand's forceful demand for probability theory is firmly established, and the nature of the probability theory to be used is well understood, all that remains is the development of measurements for the purpose of implementing the scheme for decision analysis offered herein. Initially, it should be recognized that two separate and distinct scales should be developed to fully and meaningfully encompass the variety of loss possibilities that could be included within Hand's "calculus." A loss continuum, or scale, must be developed for both the property and human loss. While both types of loss ultimately would share in the recovery, no attempt should be made to equate the two scales because they are mutually exclusive.

Given the acknowledged equilibrium point of $B = P < L$, the decision maker, be he judge or jury, would determine the weight to be assigned to each variable. That is, independent values must be given to the burden of taking adequate precautions to prevent the given injury (B), the probability that the injury will occur (P), and the gravity of the resulting injury (L) if it does occur. Of course the time, place, and general nature of the circumstances must be considered. For example, let us assume that the decision makers collective and subjectively scaled value for determining the strength of the burden of taking adequate precautions in a given situation was .75 on a property loss continuum where 0.00 was absolutely no burden and 1.00 was the maximum burden. The decision makers collectively deemed that the probability of the injury was .80, where 0.00 is certain non-occurrence and 1.00 is certain occurrence. The decision makers collectively deemed that the gravity of the property loss was subjectively valued as being .40 on a property loss continuum where 0.00 is designated as a totally slight injury and 1.00 is designated as the most grave injury. Based on these subjective assessments, and because $B > P \times L$ ($.75 > .8 \times .4$), a duty existed to take the necessary precautions to prevent the injury from occurring and was not overcome by the interactive effect of $P \times L$. Hence, the duty was breached and liability attaches.

III. JUDICIAL DISCRETION AND SALVAGE AWARD DETERMINATIONS

Perhaps nowhere in the law is the use and abuse of discretion more obvious than in the determination of a salvage award made by an admiralty court. It is admitted and even sanctioned in courts and legal treatises that salvage awards are controlled by judicial discretion.⁴³ The limits of this discretion appeared to be so boundless that, in 1882, Judge Hughes found it necessary to state that while the amount of the salvage award rested squarely within the discretion of the judge, he must not capriciously nor arbitrarily arrive at a decision. Indeed, he must fully recognize the law of salvage.⁴⁴

A variety of courts have attempted to lessen the almost inherent arbitrary and capricious nature of determining the amount of a salvage award by listing a number of factors, elements, or ingredients upon which the salvage award depends. For example, in *The Sandringham*, the court defined salvage as

[a] reward or bounty exceeding the actual value of their services, given to those by means of whose labor, intrepidity, and perseverance a ship or her goods have been saved from shipwreck or other dangers of the sea It may be laid down as a cardinal part of salvage that the right of compensation to be allowed in any case must not only compensate the labor and exertion and danger attending the particular enterprise, but must be so liberal, if the condition of the fund at disposal permit, as to attract public attention⁴⁵

Other examples where the courts have listed or acknowledged the independent variables to be considered when determining the amount of salvage awards exist,⁴⁶ but the most classic and quoted

43. G. GILMORE & C. BLACK, *THE LAW OF ADMIRALTY* 559-62 (1975); *The Shreveport*, 42 F.2d 524 (E.D.S.C. 1930). Further, in *Waterman SS. Corp. v. Dean*, 171 F.2d 408, 411 (4th Cir. 1948), the Court acknowledged that "[t]he trial court is given wide discretion in fixing the amount of a salvage award, and appeals questioning only the amount awarded are not encouraged." See also *Mississippi Valley Barge Line Co. v. Indian Towing Co.*, 232 F.2d 750 (5th Cir. 1956) and *Paunier v. Barge BT 1793*, 395 F. Supp. 1019, 1037 (E.D. Va. 1974), in which the court candidly admitted that "whatever is salvaged is still the property of the owner, but he owes whatever salvage award the court thinks is proper."

44. *The Sandringham*, 10 F. 556 (E.D. Va. 1882).

45. *Id.* at 572.

46. See, e.g., *The Robert S. Besnard*, 144 F. 992, 1002 (D.S.C. 1906) where the court stated:

Salvage is in the nature of a bounty for extraordinary exertions, as distinguished from payment for ordinary exertions, being the outgrowth of public policy, and designed to encourage persons who are under no legal obligations to do so to go to the rescue of vessels exposed to perils beyond their own ability to subdue, by giving

list of factors that an admiralty court uses when determining the size of salvage awards was given by Justice Clifford in *The Blackwall*,⁴⁷ where he said:

Courts of admiralty usually consider the following circumstances as the main ingredients in determining the amount of the reward to be decreed for a salvage service:

- (1) The labor expended by the salvors in rendering the salvage service.
- (2) The promptitude, skill, and energy displayed in rendering the service and saving the property.
- (3) The value of the property employed by the salvors in rendering the service, and the danger to which such property was exposed.
- (4) The risk incurred by the salvors in securing the property from the impending peril.
- (5) The value of the property saved.
- (6) The degree of danger from which the property was rescued.⁴⁸

a reward in addition to compensation for the work done. The amount of such bounty or reward depends upon the success achieved, the value of the property saved, and the degree of danger from which it was rescued, and it is enhanced or diminished according to the skill or courage displayed, the time and labor bestowed, and the risk to persons or property encountered by the salvors. While there are many ingredients, the one essential element is that the property shall be saved from danger, either actually impending or reasonably to be apprehended. In the absence of such peril, it is not 'salvage,' however beneficial and meritorious the service may be.

See also The Thomas Morgan, 123 F. 781, 785 (D.S.C. 1903), in which the court stated:

Salvage is personal in its primary character, and the ingredients of salvage service, as generally stated, are: First, enterprise in the salvors in going out in tempestuous weather to assist a ship in distress, risking their lives to save life and property; secondly, the degree of danger and distress from which the property is rescued; thirdly, the degree of labor and skill undergone and displayed by the salvors; fourthly, the time occupied; fifthly, the respective values of the property saved and risked. When all these concur, a large award will be given. When none, or scarcely any, the compensation can hardly be termed a salvage compensation; but it is little more than remuneration *pro opere et labore*. Hence, a mortgagee of a tug that had been sunk, who allowed lighters to the owner under hire expressly stipulated, is not a "salvor." This is because another raised vessel and the lighterman performed no service, except as watchman. Moreover, the hire of the lighter did not rank as a salvage claim.

For an appropriate discussion of these independent variables and the usage of these variables by the various courts, *see* G. ROBINSON, *HANDBOOK OF ADMIRALTY LAW IN THE UNITED STATES* 739-52 (1939).

47. 77 U.S. (10 Wall.) 1, 14 (1869).

48. *Id.* While Justice Clifford's list is generally accepted as "the list," *see* Lancaster v. Smith, 330 F. Supp. 65, 67 (S.D. Ala. 1971), a variety of cases acknowledge the existence of other possible independent variables. *See, e.g., The Shreveport*, 42 F.2d 524, 528 (E.D.S.C. 1930) and *The Sandringham*, 10 F. 556, 573 n.38 (E.D. Va. 1882). For the most part, the different lists do not vary extensively. Clifford's list captures the substance of all but a few of the lists. *See also* *Barge 592 v. Delroy*, 1938 Am. Mar. Cases 57 (E.D. Pa.), which extensively cites the *Blackwall* decision stating that the amount of salvage award is a matter to be determined by sound judicial discretion.

While Justice Clifford's list of "main ingredients" (independent variables)⁴⁹ is an attempt at precise acknowledgement and subsequent measurement of each "ingredient," the "law of salvage" has contorted the list as a justification for avoiding such precision. Gilmore and Black state that the list demonstrates that

[t]he variables are so many and so incapable of exact measurement that it will probably be fruitless for either party to take an appeal merely on the ground that the award was incorrectly computed.⁵⁰

The authors further bolster their position by suggesting that such imponderables as "skill," "energy," "risk," and "danger" are, of course, immeasurable.⁵¹

Granted that no two cases are alike and that one must view all of the attendant circumstances of each case before any amount can be determined,⁵² nevertheless, Gilmore and Black's total avoidance position, as well as the position of admiralty law, is hardly acceptable when appropriate measurement techniques are available. It has become obvious that while the Court in *The Blackwall* called for measurement standards, this was followed by a rationale for non-measurement and a failure to undertake any serious steps toward that end. Unfortunately, this demonstrates a form of intellectual myopia that encumbers the law in this area. An infinitely more desirable alternative to this myopia would be to attempt to bring precise independent variable recognition and measurement to the "main ingredients" that determine the amount of a salvage award. The law's hesitation to even attempt to measure the input becomes even more puzzling when one realizes that an admiralty court's determination of a salvage award must be couched in monetary terms. The present determinative formula appears to be no more than the consideration of a few main ingredients in conjunction with an acknowledgement of the "surrounding circumstances" resulting in a salvage award of a given amount.

This article is concerned with: 1) the acknowledgement of Clifford's "main ingredients," or independent variables, by case law and, 2) the development of a decision model based on the usage of subjective probabilities to reflect measured relationships among the

49. The most extensive list is presented by M. NORRIS, *THE LAW OF SALVAGE* 385-422 (1958). Between the main categories and subcategories of independent variables, the author lists and discusses an incredible 35 categories.

50. G. GILMORE, *supra* note 43, at 559.

51. *Id.*

52. *The Wahkeena*, 56 F.2d 836 (9th Cir. 1932).

various independent variables. The single goal of this model is to structure the discretion of judicial decisions for salvage awards by rendering such decisions more orderly, justifiable, informative, and predictable. Therefore, the focus will be on the unquantified and verbally positive model of present admiralty market place law regarding salvage awards, followed by a presentation of the author's quantified normative model for the purpose of creating a better functioning marketplace.⁵³

IV. INDEPENDENT VARIABLE ACKNOWLEDGEMENT

Most salvage award judgments, either implicitly or explicitly, consider Clifford's list of main ingredients⁵⁴ when determining the size of the award. Consequently, admiralty judicial discretion is framed around the recognition of Clifford's list. Indeed, this list has been referred to "as a category of reasons for giving much or little."⁵⁵ Unfortunately, this statement defies a consistent interpretation. The mere listing of the ingredients assumes that each ingredient is measurable and, thus, considered in the salvage award decision. In reality, only the most perceptive could expect such a specific input-output relationship.

The immediate task, therefore, is to discuss each of Clifford's ingredients and to establish a measurement scheme for each one. This will be followed by a determination of the relationships among the various ingredients. The format for this section will be first to fully develop each of Clifford's ingredients by case law. This will enable the reader to appreciate the state of the law for each of these variables and to determine the need for a meaningful measurement scheme. The second objective of this section is the development of a formula that will accurately describe the relationship among Clifford's various ingredients.

Based on these objectives, the order of Clifford's main ingredients to be discussed is based upon the measurement or evaluation technique to be used for the specific ingredient, which, in turn, is deduced from the case law surrounding each ingredient. This order

53. It may be helpful for the reader to consider the further development of this article in light of the well worn general formula for dependency. That formula is $Y = f(X_1, X_2, \dots, X_n)$ where Y equals the dependent variable or the amount of the salvage award to be determined and X_1 through X_n are the various independent variables, or Clifford's "main ingredients" upon which Y depends for its value.

54. *The Blackwall*, 77 U.S. (10 Wall.) 1, 14 (1869).

55. *Canadian Gov't Merchant Marine, Ltd. v. United States*, 7 F.2d 69, 70 (2d Cir. 1925).

reflects whether the measurement scheme selected is on the usual monetary basis, or whether the scheme chosen is a probabilistic one. The first three ingredients to be discussed are the value of the property saved, the value of the salving property, and the labor and time spent by salvors rendering salvage. These ingredients are immediately convertible based on conventional property evaluation techniques. This is not true, however, for such intangibles as the danger from which the salvaged property was rescued, the salvor's risk in saving the property, and the promptitude, skill, and energy of the salvage operation. These last ingredients all share the characteristic of not being amenable to direct monetary measurement. This measurability distinction has not been recognized by case law. While case law has increased or decreased salvage awards based on danger, risk, and skill, it has never seen fit to specifically and consistently measure that danger, risk, or skill. Case law has been a series of unstructured discretions in determining danger, risk, and skill. This is because the law has failed to measure and justify the danger, risk, or skill relative to the awarded value of the property salvaged and the labor and time spent by salvors. Courts must formalize the importance and value of the degree of danger to the salvaged; the risk taken by the salvor; and the promptitude, skill, and energy used in salving. This should be done in each salvage award determination case by using scientific or empirical methodology. While this method would not eliminate discretion completely, it would certainly constrain and structure that discretion. The final result would be a better informed and predictable marketplace of salvage award determinations. In essence, the quality of justice would be improved.

The following analysis is not meant to be inflexible. Rather, it is meant to be an evolving-working analysis for the purpose of moving the determination of salvage awards from the arena of unstructured discretion to the arena of structured discretion, yielding well justified and predictable decisions.

A. *The Salvaged Property's Value*

The value of the property salvaged has always been an ingredient "of the greatest importance in deciding on the award to be made."⁵⁶ Judge Cochran, in *The Shreveport*,⁵⁷ wrote that the great contest had been over the sound value of the salvaged ship and the necessary

56. G. GILMORE & C. BLACK, *supra* note 43, at 560.

57. 42 F.2d 524 (E.D.S.C. 1930).

repairs.⁵⁸ Relying on Judge Cochran's statement, Gilmore and Black claim that while "[v]aluation of the salvaged property is only one of the items . . . it is unquestionably the most important one"⁵⁹ While this statement may overstate the relative importance of the value of the salvaged property, nonetheless, it adds validity to its acceptance as a main ingredient or independent variable.

The determination of this ingredient is guided by the following considerations: 1) the actual value of the salvaged property,⁶⁰ be it ship, freight, or cargo, is the upper theoretical limit of the salvage award. This is so because one element of a salvage claim is the successful saving of the property for the owner's benefit;⁶¹ 2) the courts generally have determined that the amount of the salvage award is based on the value of the property in her damaged state at the time of the salvage and not the value that existed prior to the time of peril or distress.⁶² For example, the value of *The Captain Tom* and *The Tom R. Jr.*,⁶³ designated at the time of their stranding, was \$16,000 and \$7,000, respectively. The value was not based on their worth before salvage which was \$18,500-\$21,500 and \$13,000, respectively;⁶⁴ 3) it has been determined that the burden of proving the value of the salvaged property rests upon those claiming the salvage award;⁶⁵ and, 4) as nearly as can be determined, conventional property law is used to determine the value of the salvaged property.⁶⁶

B. *The Salving Property's Value*

Although the value of the salving property used in salving operations has been deemed to be one of the ingredients to be used when determining the amount of the salvage award, admiralty courts have been less concerned with this ingredient than with

58. *Id.* at 530.

59. G. GILMORE & C. BLACK, *supra* note 43, at 561.

60. The value judgment problem when setting priorities in Clifford's ingredients is alluded to in the discussion concerning the danger ingredient. See note 92 *infra*.

61. G. GILMORE & C. BLACK, *supra* note 43, at 561.

62. See, e.g., *The Mexico*, 252 F. 880 (E.D. Va. 1918); *Beach Salvage Corp. of Fla. v. The Captain Tom*, 201 F. Supp. 479 (S.D. Fla. 1961).

63. *Id.*

64. *Id.*

65. *Nolan v. A.H. Basse Rederiaktieselskab*, 267 F.2d 584 (3d Cir. 1959).

66. It is beyond the scope of this article to demonstrate property valuation techniques. To do so, even in a skeletal form, would require the intensive and extensive coverage of an entire article. The determination of value *vis-à-vis* stipulation and judicial sale, using such evaluation techniques as income generation, reproduction costs, replacement costs, market value determination, and insurance value, is neither simply nor quickly dismissed.

others.⁶⁷ As with the value of the salvaged property, the value of the salvaging property is determined at the time of the salvage.

While the value of the salvaging property⁶⁸ is not determinative of the size of the salvage award, its constraining affect is exemplified in *The Ocklawaha*.⁶⁹ In this case it was acknowledged that the salvaging property was worth approximately \$56,000. Therefore, it was reasoned that to allow the trial award of \$45,000 to stand would mean that the salvor "would receive over an 80% recovery on its capital risked."⁷⁰ Consequently, for that reason, and also because the risk involved was over-estimated by the trial court, the salvage award was reduced to \$22,730.53, or approximately forty percent "recovery on the capital risked."⁷¹ The value of salvaging property seems to have been used by admiralty courts either as a separate variable, or as a justification for an award which is buoyed by one of the other more important main ingredients.

C. *The Salvor's Labor Expenditures*

It appears that for labor to have a significant impact upon the amount of the salvage award, it must be uniquely superlative.⁷² Moreover, the time spent during the labor of salvaging affects the salvage award depending upon how the time is related to the risk incurred by the salvors or their property. For example, in *The George W. Clyde*,⁷³ a salvage award of \$1000 was given the salvors where the value of the salvaged vessel and cargo was estimated at \$50,000. This was because the salvaging labor lasted for only fifteen minutes and was made in the near total absence of risk or danger.

Another example of the courts seeking the ingredient of peril, danger, or risk as a concomitant to the time of salvaging labor expended is witnessed in *Sobonis v. Steam Tanker National Defender*⁷⁴ where the vessel S.S. Mesologi was chartered by the S.S. National Defender to relieve the latter of some of its cargo

67. *The Devonian*, 150 F. 831 (D. Mass. 1907).

68. It should be noted that the cargo and freight aboard the salvaging property are not considered part of the value of the salvaging property. See G. GILMORE & C. BLACK, *supra* note 43.

69. 348 F.2d 627, 629 (2d Cir. 1965).

70. *Id.*

71. *Id.*

72. For examples of court discussion of this ingredient, see *The Shreveport*, 42 F.2d 524 (E.D.S.C. 1930), and *The Sandringham*, 10 F. 556 (E.D. Va. 1882).

73. 86 F. 665 (2d Cir. 1898). For the same type of reasoning in the reduction of a salvage award, see *The Egbert H.*, 131 F.2d 111 (5th Cir. 1942).

74. 298 F. Supp. 631 (S.D.N.Y. 1969).

after the former had run aground on a reef. In *Nicholas E. Vernicos Shipping Company Ltd. v. United States*⁷⁵ the court similarly acknowledged that the simplicity of the salvaging operation and the minimal risk incurred by both the salvaged and salvaging vessel indicated "an instance of low order salvage" labor. Hence, this influenced the final award of \$24,098.70 to the salvors and wages to the crew.

A reading of decisions concerning the labor ingredient leads one to conclude that this ingredient is almost meaningless and requires that its value be established by its relationship to the risk, danger, or peril⁷⁶ incurred by either the salvaged or salvors.

D. The Degree of Danger from Which Property and Lives are Rescued

A significant factor in determining whether the service rendered by the salvors should be compensated by a large, moderate, or small award is the degree of danger from which the property or life has been delivered. A large award is usually found where the peril of loss to lives or property⁷⁷ is imminent. Salvaged property is considered in serious danger when destruction is imminent.⁷⁸

*Connolly v. S.S. Karina II*⁷⁹ provides an outstanding example of a court's reliance on the seriousness of the danger to determine the amount of salvage award. The fishing boat *Terecita* responded to the S.S. *Karina II*'s call for help by towing the disabled vessel to safety. It was determined that the plaintiffs were salvor's in the highest sense of the word because the risk of loss of their ship, cargo, and crew would have been total if the ship had drifted onto

75. 233 F. Supp. 116 (S.D.N.Y. 1963).

76. The risk, danger, or peril type of ingredient is one most often embellished with a labor ingredient discussion.

77. The inclusion of life or lives with property certainly is not meant to reduce the value of human life to monetary terms. Yet, it must be acknowledged that, in spite of the obvious theoretical repugnancy for doing the same, it is done commonly by courts as well as by the insurance industry. While a discussion concerning the validity of reducing life to monetary terms may be an appropriate philosophical or religious topic, it is not an appropriate one for this article.

78. See, e.g., *S. Am. S.S. Co. v. Alt. Towing Co.*, 22 F.2d 16 (5th Cir. 1927) and *United States v. The Barge CBC 603*, 233 F. Supp. 85 (E.D. La. 1964) where it was acknowledged that the serious danger from which the barge was rescued was the major determinant of the salvage award. It should be noted that no attempt will be made to discuss the infinite number of perilous conditions which may yield a serious danger. Fire, explosions, and severe weather are a few of the potential serious dangers. To fully list and discuss them is meritorious of separate treatment.

79. 302 F. Supp. 675 (E.D.N.Y. 1969).

the coral reef. The court acknowledged that its finding a \$6,300 salvage award for the plaintiffs was primarily based upon the gravity of peril to the loss of property.

On the other hand, when the danger is moderate or slight, court awards reflect this determination. A salvage situation of this type does not have the immediacy of a large or total loss. While these perilous situations feature danger and anxiety, the certainty of destruction and hopelessness witnessed by the grave danger situation is not present. For example, in *The Alice*⁸⁰ the court found moderate or slight danger when a vessel was imperiled by a fire that could be either confined or was too remote to create an apprehension of danger. Unquestionably, when the element of danger to life and/or salvaged property is diminished, a diminution of the value of the salvage service occurs. This same point is illustrated further by *Star Towing Co. v. The Barge Org-6504*⁸¹ where the court held that the Star was a meritorious salvor to the tune of \$5,250 for its efforts in saving a sinking barge. The court admitted that the award recognized the important fact that "the salvage was not effected in hazardous conditions" and that there was no apparent danger to the Star's personnel or equipment. Logically, when the salvaged property is in no peril and never claimed to be, no award should be made.

E. The Salvor's Risk

The ingredient of the salvor's risk to life and property is one of the more important independent variables when determining the amount of the salvage award. The degree of risk to which a salvor exposes himself, as long as it is not foolish or heedless,⁸² must be considered with the other circumstances surrounding the salvage service. To this point, Sir William Scott in the 19th century stated that

what enhances the pretensions of salvors most is the actual danger which they have incurred. The value of human life is that which is, and ought to be, principally considered in the preservation of other men's property, and if it be shown to have been

80. 244 F. 415 (4th Cir. 1917). See also *The Emanuel Stauroudis*, 23 F.2d 214, 217 (D. Md. 1927) where the court stresses the salience of danger and labor as salvage award determinants.

81. *Star Towing Co. v. The Barge ORG-6504*, 301 F. Supp. 819 (E.D. La. 1969).

82. See, e.g., *Beach Salvage Corp. of Fla. v. The Captain Tom*, 201 F. Supp. 479 (S.D. Fla. 1961), in which the court noted that when peril can be avoided, but is not, the perilous conditions should not be considered when determining the amount of the salvage award.

hazarded, it is most highly estimated.⁸³

Certainly, the risk the salvor faces either enhances or diminishes the amount of the award to be made. Yet, its absence should not preclude an award being made.⁸⁴ In essence, when the risks to which the salvors are exposed are greater, *ceretis paribus*, the award should be greater than when the risk is minimal or absent. In *Young v. Smith*,⁸⁵ a salvage award of \$4,400.31 was given to a salvor, \$1,000 of which was an acknowledgement that the salvor had undergone substantial risk. The particular risk in this case entailed the salvor being threatened by Guatemalan gun boats during the salvage operation. Note that the award was made even though the value of the property employed by the salvor was negligible.

Another example of the effect that risk has on the amount of the salvage award appears in *The Ocklawaha*.⁸⁶ There an appellate court reduced the amount of a salvage award from \$45,000 to \$22,730.53, noting that the risks encountered by the salvor had been severely overstated and that the record did not indicate either unusually high seas or any danger of the salving vessel breaking up. The court further stated that, throughout the salving operation, the salving "personnel and equipment were not exposed to endure peril beyond the danger which attends a vessel . . . stranded . . . in the face of the open ocean."⁸⁷

The incidents and circumstances under which courts have deemed serious risks arising are voluminous. Suffice it to say that the existence, or lack thereof,⁸⁸ of serious weather, fire, explosions,⁸⁹ and other serious risks where the salving property and lives are endangered, have all had an impact upon the ultimate size of the award.

F. *Salvage Service Promptitude, Skill, and Energy*

The promptness, skill, and energy with which salvors undertake their tasks affect the amount of the salvage award. In some instances the absence of these qualities may be fatal to a salvage effort. For example, great promptness and energy when fighting a

83. *The B.C. Terry*, 9 F. 920, 927 (D. Ga. 1881).

84. This assumes that the service rendered is a salvage and not a pretense at salvage.

85. 1966 Am. Mar. Cases 2654 (Md.).

86. 348 F.2d 627 (2d Cir. 1965).

87. *Id.* at 629.

88. *Id.*

89. *Devine v. United Transportation Co.*, 1957 Am. Mar. Cases 175 (W.D. Wash. 1956).

fire aboard a vessel⁹⁰ being salvaged must be favorably received by the courts. Indeed, if all other factors remain equal, a salvage award may be enhanced or diminished by considering the promptness, skill, and energy employed by the salvors. Courts of admiralty have been quick to laud and reward salvors where their operations have been marked with skill, experience, and judgement.⁹¹

In *The Ocklawaha*,⁹² the court commented on the fact that the salvaged vessel was saved by the "timely and energetic"⁹³ efforts of the salvaging vessel and thereby acknowledged the salvor's skill and energy when considering the amount of the salvage award. Actually, it appears that the trial court may have been unduly influenced by the salvor's efforts when arriving at an award, because the appellate court lessened the award on other grounds.⁹⁴

In *Nicholas E. Vernicos Shipping Company Ltd. v. United States*,⁹⁵ the court determined that the tugs Vernicos Manos and Kentavros were salvors because of the salvor's quick and conscientious work on behalf of the U.S.S. Altair and the U.S.S. Mercury. The *Vernicos* court held that the salvors exhibited skill and dispatch by pushing against the ships for four hours in a fifty knot storm to prevent the lines from breaking.⁹⁶ This action greatly reduced, and possibly eliminated, the salvaged ships exposure to certain disaster. Therefore, the salvor's skill and promptitude was an important consideration when determining the amount of the salvage award. That court also acknowledged that "the promptness of their response to the call for assistance weighs heavily in their favor"⁹⁷ and "the skill and efficiency displayed by the libellants during the time of their service is unquestioned."⁹⁸ Thereupon, a \$24,098.70

90. G. GILMORE & C. BLACK, *supra* note 43, at 559.

91. See, e.g., *The Santa Barbara*, 299 F. 152 (4th Cir. 1924) and *Joncich v. Xitco*, 172 F.2d 1003 (9th Cir. 1949). See also *Baretich v. United States*, 97 F. Supp. 600, 604 (S.D.N.Y. 1951) where the court said:

Experiences as harrowing as those suffered by the libellants are not common. The skill and bravery displayed by them and the dangers to which they were subjected are also not common. I believe, therefore, that they should be rewarded well for their services, and in my discretion, I award the sum of \$2,000 to each of the libellants. In fixing this sum I have taken into consideration the skill and bravery displayed by these libellants and the potential dangers to them on this journey (emphasis added).

92. 348 F.2d 627 (2d Cir. 1965).

93. *Id.* at 629.

94. *Id.*

95. 233 F. Supp. 116, 120 (S.D.N.Y. 1963).

96. *Id.*

97. *Id.*

98. *Id.*

award plus wages to the crew was presented to the salvor. The court in *Beach Salvage Corporation*⁹⁹ also found significant the fact that the salvor immediately went to work offering salvage services as soon as the salving equipment arrived.

On the other hand, the absence of skill, promptitude, or energy may diminish a salvage award. For example, in *Nicastro v. The Peggy B.*,¹⁰⁰ the respondent charged that the salvors were unskilled in their towage and, therefore, a reduction in the amount of the award was required. The court acknowledged the principle of diminishing the value of the award if the rescue had been unskillful, but claimed that the towing operation had been conducted in a manner that experienced fishermen deemed proper.

It seems fair to conclude that, while promptitude, skill, and energy definitely influence the amount of salvage awards, such factors certainly have not been determinative of salvage award amounts. Therefore, they must be viewed in the light of Clifford's other main ingredients.

V. THE NORMATIVE MODEL

After considering all of Clifford's main ingredients in a disaggregate manner, it is obvious that the court's analysis must ultimately be made on an aggregate plane. It also is obvious that any analysis must recognize each ingredient separately. In short, any meaningful and predictable salvage award decision must be based on the proper measurement of and relationship between each of Clifford's six main ingredients by using "the law"¹⁰¹ in conjunction with the logical equities of the surrounding circumstances. It is at this precise point that the traditional legal decision analysis casts its proponents adrift; but it is also at this precise point that modern probability decision theory is available to effectuate a rescue. Clifford's ingredients must be acknowledged and evaluated by each court. It is with this evaluation that the courts have failed, because they have not recognized the relationship that exists between these

99. *Beach Salvage Corp. of Fla. v. The Captain Tom*, 201 F. Supp. 479 (S.D. Fla. 1961).

100. 173 F. Supp. 61 (D. Mass. 1959). A similar evaluation was made by the court in *Conolly v. S.S. Karina II*, 302 F. Supp. 675 (E.D.N.Y. 1969). The court acknowledged that the captain and his crew were mariners by avocation and, therefore, hardly could be "expected to display the skill of professional salvors who are entitled to higher awards because of their professionalism."

101. "The law" primarily refers to case law, but certainly the notion of statutory law, while not considered in this work, is included.

ingredients. Moreover, each ingredient must be determined, and measured or evaluated.

The establishment of measurement and relationship schemes is a necessary operation for the structuring of discretion in judicial decisions. This is consistent with Davis' conceptualization of controlling excessive discretion.¹⁰²

In the face of an uncertain outcome, and no objective sample data, Justice Clifford is demanding that evaluations be attached to his independent variables resulting in the determination of the salvage award. Clifford's ingredients and their wide acceptance demands that those who determine a salvage award must bring their best judgement to bear by using optimum common sense and legal instincts to: 1) quantitatively determine the specific relationship to be given each independent variable with the dependent variable; and 2) establish the value of each independent variable which, in conjunction with its relationship, will determine ultimately the amount of the salvage award. Clifford's call to establish and implement a measured relationship scheme is less explicit than Hand's; nevertheless, it exists and therefore demands investigation.

With a case law understanding of Clifford's main ingredients, the necessity for measurement and evaluation firmly established, and the nature of the measurement theory understood, all that remains is the actual implementation of the decision-analysis scheme which is offered herein. Implementation is comprised of two basic tasks. The first task that any court must face when implementing the scheme offered is to discover the relationship that each independent variable has with the other independent variables (Clifford's main ingredients). This discovery should be made according to evolved case law and its adjustments. Each court should seriously consider prior decisions and their apparent rationales, as well as the surrounding circumstances of the case at bar.

At first glance this methodology may be seen as a mere restatement of present legal methodology because of similar use of case law, rationale, and surrounding circumstances. That, however, is not the case. Unfortunately, present legal methodology does not press the necessity of specifying measured relationships among the ingredients with appropriate statements of justification. At present, all that appears necessary is that the ingredients be acknowledged and considered in some nebulous and mystical manner immedi-

102. K. DAVIS, *supra* note 1.

ately preceding the determination of a given salvage award.¹⁰³

One could logically conclude that the measured relationships of the ingredients and the rationale for establishing patterns will aid the predictability of decisions and benefit the marketplace of judicial decision making.¹⁰⁴ These measured relationships will force an unprecedented openness of judicial decision making. This technique structures the heretofore unstructured judicial discretion employed when determining salvage awards. Subjective probability is the theoretical basis for such information gathering and usage. The basis of most subjective probability analysis is the utilization of existing information to improve one's decision making ability. In essence, the more information in the legal marketplace, the more perfect and predictable the marketplace will be. As economics posits more open information on the marketplace, the likelihood of having a freer and fairer marketplace increases.¹⁰⁵

103. See notes 43 and 75 *supra*, and accompanying text.

104. See note 105 *infra*.

105. The concept of the perfect marketplace, or perfectly competitive marketplace, is borrowed from economic theory. Stated simply, economics posits that the most desirable marketplace is where all parties are permitted complete and free access to and from, as well as interaction within, the marketplace. The problem of achieving a perfect marketplace is that of materializing the few basic assumptions that underlie perfect competition. The assumption that appears to be both a partial basis for the other assumptions, as well as the most often violated, is that of perfect information. Perfect information means that each marketplace actor has correct and complete information about all other marketplace actors. The result of perfect information is a marketplace that is perfectly fluid on both the supply and demand sides. Thus, each producer would maximize his profit, and each consumer would maximize his utility by purchasing the best quality goods possible at their lowest price levels.

The general topic of the economics of information has commanded considerable attention recently. See e.g., F. MACHLUP, *THE PRODUCTION AND DISTRIBUTION OF KNOWLEDGE IN THE UNITED STATES* (1962) and George Stigler, *The Economics of Information*, 69 J. OF POL. ECON. 3 (1961) who have considered this subject matter. This topic generally stresses the strong relationship between imperfect information and an imperfect marketplace.

The importance of information within our legal system is well documented both by our laws and administrative agencies. For example, freedom aspects of information often are quoted from the constitution. Moreover, the channel of distribution through which information flows to the marketplace, the mass media, is a primary concern of both the Federal Communications Commission and the Federal Trade Commission.

Let the marketplace analogy become mired in the quagmire of economic theory, one could charge the legal system as being a monopoly that injures competition. The indictment is clear. The law, of its own volition, has prevented a truly competitive adversary system by perpetuating imperfect information. Perfect legal information is that which is not only truthful and accessible to all parties, but interpretively predictable by all parties as well. If we are to embrace the notion that justice should not be general and, hence, unpredictable, then we its correlative, also must be embraced. That is, that justice has an inequitable base. Justice will be more than just for those able to acquire sensitive information about the characteristics of a judge, jury, injury, or geography, than for those who may not have the same acquisition opportunity. All parties to an adversary proceeding should be able to estimate, with reason-

Once the courts have established the proper relationship between each of Clifford's independent variables they must complete the second operational task. A value for each variable must be determined. The value assigned to the behavior of any given variable relates to the expected value or the extreme of that variable. Given a range of possible values, the court must decide the value of a particular variable.

The scheme for determining the amount of a salvage award will consider: 1) the nature of the measurement technique or value determination for Clifford's ingredients; 2) the relationships between Clifford's ingredients; and 3) the operation of the formula derived from the measurement and relationship schemes pertaining to Clifford's ingredients.

A. Value or Measurement Determinations

First, a functional view of Clifford's list is necessary.

The formula is: $Y = f(X_1, X_2, X_3, X_4, X_5, \text{ and } X_6)$.

Y = Salvage award amount.

X_1 = Degree of danger from which property and/or life was rescued.

X_2 = Value of property saved.

X_3 = Risk incurred by the salvors in securing the property from the impending peril.

X_4 = Promptitude, skill, and energy displayed in rendering the service and saving the property.

X_5 = Value of the property employed by the salvors in rendering the service and the danger to which such property was exposed.

X_6 = Labor and time expended by the salvors in rendering the salvage service.

Next, a value for each variable must be determined. It is suggested that the usual legal procedures for determining personal property valuation be used for X_2 and X_5 . Essentially the same method should be utilized for the valuation of X_6 regarding the salvor's time and efforts expended. A monetary value for these variables must be stated and proven by a series of evidentiary offerings and counter-offerings. Consequently, an empirically precise amount developed within a sound rationale should evolve for each variable.

able accuracy and certainty, the nature of their positions relative to each other as well as to the law. Their ability to make such estimates are tied inextricably to the balance between perfect information and uncontrolled or imperfect information.

X_1 , X_3 , and X_4 are variables whose values are not readily measurable. Yet, a valuation must be placed upon these variables. It is suggested that subjective probability be deployed. Specifically, X_1 , the degree of danger from which the property was rescued, should be valued on a probability continuum where 1.00 represents maximum peril and .00 represents no peril whatsoever. The parties to the adversary proceeding should present evidence concerning the probability of danger whereupon the judicial decision maker, whether judge or jury, would then face the difficult and precise task of subjectively determining the degree or probability of danger. If the determination were made by a jury, it should be accomplished by averaging the assessments among the decision makers. The same format would be appropriate for X_3 and X_4 .

B. Relationship Determination

Once the valuation scheme for Clifford's main ingredients is determined, then the relationship between the ingredients must be established. There are three possible formats to be used when establishing these relationships. First, the internal approach would view case law precedent resulting in a retrospective determination of the relationship. Second, the external approach would consider only the attitudes and opinions of the decision makers.¹⁰⁶ A poll would then be taken to discover the relationships between Clifford's variables. The third format would adopt some combination of the internal and external approach.

This article will pursue the internal approach because of its entrenchment in the legal field. By adopting this approach it can be demonstrated that even an entrenched format can service the need of controlling judicial discretion. Hopefully, the result will be the elevation of justice by fostering judicial decisions that are more predictable, explainable, and understandable.

The following formula is deduced from the relationships among Clifford's ingredients as gleaned from case law.

$$Y = X_1 \cdot X_3 \cdot X_4 (X_2 + X_5 + X_6)$$

where $Y \leq Z_2$

The value of the salvage award (Y) is constrained by the value of the salvaged property (X_2) because the salvaged property theoretically is the upper limit of the salvage award.¹⁰⁷ The salvage award values of the property salvaged (X_2), the salvaging property (X_5), and the time

106. Decision makers here specifically refers to judges and/or juries.

107. See note 70 *supra*, and accompanying text.

and labor spent salving (X_6) are separately measurable and, thus, conceptually severable. Each of these variables uniquely contributes to the value of the total salvage award in a mathematical sense. For example, a salvage award can be very large because the value of the property salvaged is very large.¹⁰⁸ This is so regardless of the salvor's property or his time and labor. Because these variables clearly are independent, they may be totaled. The value of the danger or peril from which the property was rescued (X_1), the risk to the salvors (X_3), and the skill of the salving operation (X_4) contribute to the ultimate salvage award by effecting the directly valued variables of X_2 , X_5 , and X_6 . If the danger is great, the proportionate recovery of the salvaged property and the salvor's property and labor should be increased accordingly. Further, it should be noted that X_1 , X_3 , and X_4 are largely interdependent. More importantly, however, is the fact that each variable effects the values of X_2 , X_5 , and X_6 . This means that X_1 , X_3 , and X_4 must be multiplied by each other as well as by each of the total directly valued variables of X_2 , X_5 , and X_6 .

C. A Hypothetical

The utility of the above measurement and relationship schemes can be demonstrated by considering the following example. Let us hypothesize that through proper evidentiary offerings, case law application, and property evaluation techniques, it was determined that the value of the property salvaged (X_2) was \$100,000, the value of the property employed by the salvors (X_5) was \$40,000, and the labor and time spent by the salvors (X_6) was worth \$20,000. Further, let us say that the judicial decision maker, using case law and best judgments, determines that the degree of danger (X_1) was assessed at .8, the risk incurred by the salvors (X_3) was assessed at .5, and the degree of promptitude, skill, and energy (X_4) was also assessed at .5. Finally, the formula should be applied to the obtained results for the purpose of determining the salvage award, recognizing that the award may not exceed \$100,000. Thus:

$$Y = .80 \times .50 \times .50 (\$100,000 + \$40,000 + \$20,000)$$

$$Y = .2 (\$160,000)$$

$$Y = \$32,000 \text{ which } < \$100,000.$$

Granted, this proposed scheme for determining salvage awards is not innovative. Actually, it is a mere conceptual operational extension of Hand's "calculus" in addition to being a response to the

108. See notes 65-74 *supra*, and accompanying text.

call for legal empiricism. Given the uncomplicated nature of the measurement system, the scheme might even be criticized as being too simplistic. This schedule's most obvious shortcomings include the fact that different decision makers in different courtrooms may assign unique values to the variables based on their different characteristics and experiences, as well as the different circumstances of each case. This criticism seems to diminish the generality of the proposed scheme and, hence, its predictability. This criticism, however, exists whether or not the scheme of empirical evaluation is implemented. Further, a concomitant of the proposed scheme is the requisite justification of the subjective value assigned to the variables in Clifford's formula. This enumerated process fulfills Davis' requirement of "openness" when structuring discretion. Consequently, a more open and perfect marketplace of information should occur in which all of the above mentioned conflicts may be acknowledged, assessed, and utilized when determining the subjective values to attach to Clifford's independent variables.

A major source of instability and unpredictability may be seen in the fact that the value assessment of Clifford's ingredients, particularly those variables whose values are couched in probabilities, are permitted a measure of flexibility in the spirit of subjectively based decision making. This elastic nature is permitted for the purpose of including other courtroom's subjective evaluations and objective market data when they become available. However, this criticism fails to recognize the value of the act of perfecting the marketplace of information. As more information, including both subjective evaluations and objective market data, becomes available, this perfection should occur. Moreover, one should not forget the fact that, in the legal system's marketplace, dynamism is a virtue rather than a vice. Hence, while a static formula may remove uncertainty, it may do so to the exclusion of equitable justice administration. Yet, a high degree of stability may be maintained by balancing the goal of dynamism with that of predictability.

The utilization of existing case law to derive the relationships between Clifford's various ingredients may be criticized. However, this scheme's ability to maintain an evolving format when applying modern decision techniques, without destroying previously determined legal substance, effectively counters such criticisms. The proposed scheme may be seen as both too complex and time consuming for an already overwhelmed judicial system that shows dockets that are overburdened and thus delay the timeliness of jus-

tice. While this criticism has some facial validity, it quickly fades upon the realization that the present system has been the cause of those delays. One must recognize that every scheme has its costs and benefits that must be balanced against one another. The cost of the proposed scheme involves the restraints placed upon judicial decision makers and the initial time necessary to implement this scheme.

The benefits to be derived from such a scheme include the fact that, because of this scheme's inherent goal of structuring discretion, it struggles against unbridled and uncontrolled discretionary action. This should have the beneficial effect of making the law more explainable, describable, and predictable. More importantly, the scheme's inherent quantum approach struggles against uncontrolled discretion by placing the judicial decision maker under strong pressure to rationalize and justify each variable's value, rather than to permit determinations based upon nebulous phrases and reasoning. As familiarity and experience with this scheme increases, judicial resources should be conserved and channeled under the scheme's focal direction and generalizations.

In essence, the benefits to be reaped from this scheme would far outstrip the costs, because a more perfect, explainable, predictable, and efficient marketplace of justice would occur where discretion is controlled and the determinations of salvage awards are a product of high quality legal decision making. Hopefully this proposed scheme will enable the legal system to be acknowledged as an evolving behavioral science embracing the goals of "theory . . . prediction, description and explanation."¹⁰⁹

VI. CONCLUSION

Admittedly, the proposed scheme is not without its imperfections. Nevertheless, if the proposed scheme were followed, the courts, to a large extent, could move from the unpredictable, uncertain, and basically uncontrolled judicial discretionary cloak which controls the determination of salvage awards, to a more predictable, certain, and controlled determination of those awards. The proposed model should improve in quality as the number and variety of courts and cases using such a scheme increase.

109. See notes 36 and 37 *supra*.