NOTES • DISCUSSION • BOOK REVIEWS

Causing Harm. A Logico-Legal Study. By Lennart Åqvist and Philip Mullock. Berlin: Walter de Gruyter. 1989. Pp. 353

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This book forms an important contribution to the study of the law of torts. It was published several years ago but, unfortunately enough, never received much attention. In the preface the authors compare the book with the classic work of Hart and Honoré (1959) and they do not exaggerate. As in that work, new techniques are used to analyze familiar problems of tort liability and agent causation in an innovative way. Whereas Hart and Honoré made use of language philosophy, Åqvist and Mullock introduce the apparatus of game theory to this area of legal study.

The authors set out to explain the notion of agent causation in the context of tort liability for one's own negligence. In particular, they aim to provide a rational reconstruction of the notions of causation and liability. What does it mean when we say that an agent causes something? When is an agent liable for the consequences of his actions? What do we mean by negligence? Of course, these questions are well known to anyone familiar with the study of human causation, and, in particular, to scholars in the law of torts. However, Åqvist and Mullock address and analyze them in a way which differs radically from that of their predecessors.

After an introductory Part 1, the authors present the outlines of their game-theoretic model in Part 2. The most fundamental concept of the model is that of a *game-tree*, which is a tree structure consisting of decision points and end points located at specific moments in time. The branches between the points represent the decisions made by agents. There are two types of

agents (or players): individuals and a spurious agent called Nature. At each decision point exactly one agent makes a decision. The decision of the agent determines which point of the tree will be reached next, i.e., what the situation will be at the next point in time. A play is a sequence of such decisions following each other in time. It ends when one of the end points is reached. Essentially, a play represents a possible course of events. A game-tree not only describes the various plays, it also assigns probabilities to those plays: Some plays are more likely to occur than others. To illustrate the concept of a game-tree, Åqvist and Mullock describe a situation in which one person, *x*, is so angry about the remark of another person, *y*, that he hits *y* in the face, as a result of which *y* loses all his teeth. In the relevant game-tree *x* has two choices at the initial point of the tree: hitting *y* or not hitting *y*. The next decision point is the one which is reached after *x* decided to hit *y*'s face. At this decision point Nature determines that *y* loses his teeth. (In this example, Nature does not really determine the outcome because it has only one course of action. However, one could easily conceive of a game-tree in which Nature can adopt different courses of action. Consider, for instance, those games in which a blow in the face as given by *x* can have different consequences: a bruised eye, a broken jaw, a headache, etc.) A play ends when an end point is reached, i.e., a point at which no further decisions are made. In this example, the end point is described by the situation in which *y* has lost his teeth.

A game-tree in itself is not sufficient to establish whether a person is liable in tort. We also need information about the harm or damage inflicted on persons. Furthermore, information is needed about the characteristics of the legal system under consideration. A game-tree combined with such extra information is called a *game in extensive form qualified for tort law*. For each individual it makes clear whether an individual suffers harm in any of the end points. It may, for instance, specify that losing all of one's teeth exhibits a case of harm inflicted on a person. The information about the legal system is given in the form of an ordering of the various plays of the game-tree in terms of their "approval" by the legal system. The ordering incorporates the idea that some courses of events are more in line with the specifications of the legal system than others. Hitting another man in the face elicits the system's disapproval; it is not in accordance with its regulations.

Armed with this apparatus, the authors proceed in Parts 3 and 4 of the book by "translating" the notion of agent causation into game-theoretic terms. Simplifying their presentation a little, an act of an agent is said to have caused harm to another person if and only if:

- (1) The agent did indeed perform the act ("*x* hits *y* in the face") and the harm is in fact inflicted ("*y* lost his teeth") in the relevant play of the game-tree;
- (2) The agent had the option of not performing that act ("*x* could have ignored *y*'s nasty remarks");

(3) Any play in which the agent performs that same action has a high probability of leading to an end point in which the harm is inflicted ("Hitting a man in the face usually leads to some dental emergency");

(4) If the act had not been performed then it would have been very likely that a play would have resulted in which the harm would not have been inflicted ("y would not have lost his teeth if x hadn't hit him in the face").

Since the definition contains both factual and counterfactual elements, it incorporates the idea that, in order to determine whether a person's act causes some state of affairs to arise or not, we not only need information about the effects of his actual actions (positive control), but also about the possible courses of events in case he were not to have performed those actions (negative control). The notion of human causation plays an important role in the proposed definition of liability for negligence. Again simplifying matters somewhat, an agent is said to be liable in tort to another person by having negligently performed an action that caused harm to that other person if and only if conditions (1)–(4) are satisfied and furthermore if:

(5) A course of events (play) in which the act is not performed is more approved of by the legal system;

(6) The performance of the act increases the objective probability that the harm will actually be inflicted on the other person;

(7) An unspecified number of conditions are satisfied, which are left open but which may be relevant.

Having described the conceptual apparatus and the corresponding definition of causation and liability, the authors present their main hypotheses in Part 4 of the book. The first hypothesis states that any relevant tort case in which liability for negligence is at issue can be described by a game in extensive form qualified for tort law. According to the second hypothesis, the definition given by clauses (1)–(7) actually does capture the notion of tort liability for one's negligence as it is usually employed in the law of torts. That is, assuming that the unspecified requisites of clause 7 pose no problems, the definition of liability in terms of game-theoretic characteristics is claimed to be a correct rendition of the notion of liability as it is encountered both in theory and practice.

Part 5 of the book contains a summary of the conceptual machinery. Part 6 is the largest part of the book, being devoted to a test of the hypotheses. The test consists of an examination of nine different groups of tort cases. The cases are both actual cases decided upon by courts in Sweden, England and the U.S.A., and hypothetical cases taken from the literature. Each of the cases is described in terms of a game in extensive form. Subsequently, the notions of causation and liability involved in them are examined in detail and compared with the conditions (1)–(4) and (1)–(7), respectively. With respect to the first hypothesis, the results are clear-cut. The analysis confirms the first hypothesis: The various tort cases can be adequately represented by a game in extensive form qualified for tort law. With respect to the second

hypothesis, the test shows that in most circumstances condition 6 can safely be dispensed with. Furthermore, the analysis shows that the conditions are too weak to yield sufficient accounts of negative causal control. Conditions 2 and 4 are therefore replaced by a stronger condition. Roughly speaking, this states that

- (8) The plays with the highest probability of occurring are ones in which neither the tortious act nor the harm takes place and which describe the legal system's most approved courses of events.

In other words, the test of the second hypothesis confirms that the notions of causation and liability can be defined in terms of characteristics of the game, albeit not entirely by the same conditions as proposed in the hypothesis. Condition 6 is dropped, and conditions 2 and 4 are replaced by 8. Thus the results seem to confirm the authors' main points. A game in extensive form qualified for tort law not only provides a formal *description* of cases in tort law (first hypothesis); it can also be used for the *legal analysis* of those cases since the game-theoretic interpretation of causation and liability adequately captures those notions (second hypothesis).

Although Åqvist's and Mullock's analysis is always lucid and perceptive, some questions arise. First of all, it is not entirely clear how the set of tort cases which are used to test the hypotheses has been chosen. Do those cases really represent all important types of tort cases, and if so, what criterion of relevance is employed? Secondly, the rationale underlying some aspects of the game-theoretic model is not entirely clear. A game-theoretic model usually consists of two parts—a description and a solution. The descriptive part makes clear what the various strategic opportunities of the agents are, what the outcomes are, what the preferences of the individuals are, etc. In the solution part assumptions are made about how rational players will play the game, given their preferences regarding the set of outcomes. Åqvist and Mullock only discuss the descriptive part of a game-theoretic model. Since they want to focus on the "objective" elements of tort cases only, and since preferences are clearly subjective, they do not include preferences in their description nor do they make assumptions about the way agents will behave on the basis of their preferences (the solution part). However, as seen above, the authors assume that it is possible to attribute probabilities to the various plays of the game-tree. It seems evident that the likelihood of a play is determined by the way individuals make their decisions. Since these decisions depend at least partly on the preferences of agents, it must be concluded that such "subjective elements" as preferences cannot be entirely suppressed; they must lurk behind the exogenously given probability distribution.

Developments in the social sciences during the last decades have made it abundantly clear that game theory is a powerful methodological instrument. Notwithstanding the critical notes above, Åqvist's and Mullock's study clearly shows that the same holds true for the application of game theory to the analysis of the law of torts. The formal framework is used to explicate

ambiguous or imprecise intuitions, to present and clarify subtle legal distinctions, to show where other theories of causation and liability run aground, and, more generally, to approach the study of the law of torts in a systematic and coherent way. It is difficult to do justice to the high level of sophistication which is thereby attained. Each legal case is examined in detail, the game-theoretic translations are always very plausible, possible differences of interpretation of the crucial elements of a case are always carefully examined, and the many intricacies involved are described and explained in a lucid way. Furthermore, the analysis forms an important contribution to a debate among rational choice theorists about the way rights should be analyzed within a rational choice setting (Sen 1992; Gaertner, Pattanaik and Suzumura 1992). A combination of legal notions with game-theoretic structures along the lines of Åqvist's and Mullock's approach can be very fruitful in this respect. Finally, as illustrated by the analysis of the various legal cases, the framework transcends the boundaries of particular legal systems without difficulty. It therefore also forms a genuine contribution to comparative law. For all these reasons, it seems more than obvious that the book deserves a second chance.

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