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Editor: C.M. Langan

The Society has another member, who qualified by his score on Ronald Hoeflin's new Titan Test. We greet him as:

Richard Sterman
3829 Encino Hills Place
Encino, CA 91436

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PLEASE TURN OVER

Foreword: C.M. Langan

This issue centers on the paper *2-Player Mono-Predictive Games with Contingent Rewards,* authored by George Dicks. The paper will be followed by my commentary. The remarks on this page are mainly in response to a letter which accompanied the paper when it was sent to me for publication.

While it is clearly not the author's intention to dispute the previously published material on Newcomb's paradox, he does claim that my resolution "is actually a special case of a larger solution". While this is in a sense true, it seems to imply that his treatment can be seen as a generalization of that given in *The Resolution of Newcomb's Paradox.* This requires that we draw some important distinctions about what each paper claims to do, and how and why it does it.

First, Mr. Dicks is offering a comparative treatment of several distinct Newcomb-like scenarios. These scenarios cover the viewpoint of an arbitrary subject with meager data on the predictor's methods and past efficacy; all possibilities must be exhaustively considered in the formation of a rational strategy. However, this is necessary only when confronting the subformulation of Newcomb's paradox which omits critical data on past trials. Most "rational" players confronting such a subformulation, like the majority of analysts who have addressed the entire formulation, do not really consider the possibility of actual prediction and control. But as we have seen, Newcomb's paradox has been purposely constructed so as to prevent these possibilities from being ignored; they are its *raison d'être.* There is no other sure way to reconcile ND's long string of victories with the given distribution of subjects among both possible behaviors.

Problems, and probabilities, change along with the information defining them. The Newcomb formulation, which includes information absent in the subformulation considered by Mr. Dicks, is designed to center attention on the most paradoxical - and thus, the most potentially enlightening - aspect of predictive games. This aspect is the gateway to a much larger generalization than any which may be reached through game theory alone. In fact, the *Resolution* may be considered the Γ-generalization of the situation in which the subject's data access is totally restricted, and the following paper as a "special case" of *it.*

Mr. Dicks also observes that the assumption of programmatic control implies that the demon could maintain his perfect record simply by making every subject take both boxes, and leaving the black one empty. Thus, he cannot be a true controller, since he violates his own subjective utility by unnecessarily spending his money on those who take the black box only. But this involves the unwarranted assumption that the subjective utility of demons is decidable to their subjects. While money may be valuable to human beings, it is by no means assured that demons can control their subjects as easily as they can produce it, or even that what they want - other than the apparent belief of their subjects - can be bought with it.

Nevertheless, Mr. Dicks' paper appears to have been thoroughly and carefully written, a fact which our readers may now ascertain for themselves.

2-Player Mono-Predictive Games with Contingent Rewards

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This paper will attempt to develop a generalized theory to handle 2-player games in which one player, the Predictor, will attempt to predict the behavior of the other, the Chooser. A formalism will be developed and applied to the problem while a method of estimating probabilities given experimental data of uncertain distribution will be demonstrated. Strategies which Predictors might use to alter probability in their favor will be outlined and previous attempts will be discussed. Finally, the formalism will be tried on a rather famous special case, Newcombs' Problem.

Here is the problem in a somewhat more formal form:

```
Let Players = {Predictor, Chooser}
Let PotentialChoices = {C1, C2}
Let PotentialRewards = {R1, R2,1, R2,2}
   where:
      The value of each is known to all players
      R1 is some relatively minor reward
      R2,1 is significantly less valuable than R1
      R2,2 is significantly more valuable than R1
Predictor sets PredictedChoice
such that
   PredictedChoice is a subset of PotentialChoices
iff PredictedChoice = {C2},
      Let OfferedRewards = {R1, R2,2}
   otherwise
      Let OfferedRewards = {R1, R2,1}
   where:
      R2,X will hereafter also be known simply as R2
Chooser sets ActualChoice
such that
   ActualChoice is a subset of PotentialChoices
Let ActualReward = {RX : CX is an element of ActualChoice}
What value of ActualChoice will maximize ActualReward?
```

Minimalist Choices

In these cases Chooser selects either nothing or the known reward. These choices are totally independent of the actions of Predictor.

```
if R2,1 < 0 and R2,2 < 0
   if R1 < 0
      Let ActualChoice = {}
   otherwise
      Let ActualChoice = {C1}

if R1 < 0 and R2,1 > 0 and R2,2 > 0
   Let ActualChoice = {C2}
```

Choices involving Predictor

Now that we have dispensed with the simple cases let's introduce the Predictor into our calculations and see what happens.

We begin by realizing that Predictor may be viewed as a randomizer with a certain distribution. Therefore, we will need a variable to represent this.

Let Prob = Probability that PredictedChoice = ActualChoice

Now, we can examine the two simplest cases involving Predictor. These are the cases where Prob is 1 or Prob is 0 indicating that Predictor is either always correct or always incorrect in turn. These may be determined simply by weighing the values of the respective rewards.

```
if Prob = 1
   if ActualChoice = {C2}, ActualReward is {R2,2}
   if ActualChoice = {C1, C2}, ActualReward is {R1, R2,1}
   therefore
      if R2,2 > R1 + R2,1
         Let ActualChoice = {C2}
      otherwise
         Let ActualChoice = {C1, C2}

if Prob = 0
   if ActualChoice = {C2}, ActualReward is {R2,1}
   if ActualChoice = {C1,C2}, ActualReward is {R1, R2,2}
   therefore
      if R2,1 > R1 + R2,2
         Let ActualChoice = {C2}
      otherwise
         Let ActualChoice = {C1, C2}
```

Finally, we come to the most complicated case. Here we will be calculating with a Predictor who's not always right and not always wrong but rather falls somewhere in between. As you can see this case is calculated by comparing the expected utility from each choice and selecting the most profitable.

```
if Prob < 1 and Prob > 0
   if ActualChoice = {C2},
      ActualReward is {(Prob(R2,2)+(1-Prob)(R2,1))}
   if ActualChoice = {C1,C2},
      ActualReward is {R1, (Prob(R2,1)+(1-Prob)(R2,2))}
   therefore
      if (Prob(R2,2)+(1-Prob)(R2,1)) >
         R1+(Prob(R2,1)+(1-Prob)(R2,2)),
            Let ActualChoice = {C2}
         otherwise
            Let ActualChoice = {C1,C2}
```

Probability That PredictedChoice = ActualChoice

Now we will attempt to develop a method for calculating Prob. This is akin to correlating ActualChoice and PredictedChoice.

There are two possibilities:

1. ActualChoice has no correlation to PredictedChoice
   because
   there are no hidden factors at work

2. ActualChoice correlates with PredictedChoice
   possibly because
   ActualChoice made before PredictedChoice
   or Predictor has Precognition of ActualChoice
   or Predictor makes PredictedChoice and ActualChoice
   or Predictor divulges PredictedChoice
   or some hidden variable is involved

The only way to establish the existence of such a correlation is by sampling the performance of a given predictor and calculating a likely probability of similar performance in the future. For this purpose, Certainty Theory should suffice quite nicely.

In Certainty Theory the probability, number of trials, and certainty are related: (1-Certainty) >= Prob ^ N.

Example: given a coin believed to be biased. It has shown 7 tails in 7 tosses. How certain can we be that the probability of tails is at least .55? (1-Certainty) >= .55 ^ 7. Certainty >= .98478

Example: given a coin believed to be biased. If heads appear on every throw, how many times must it be thrown to be 90% sure the probability of a head is at least .99? .1 >= .99 ^ N. N >= 230.

Now, how does this relate to calculating Prob for Predictor? In order to demonstrate, let's run some examples.

Given 10 correct predictions in 10 attempts. What minimum probability is .999 certain? .001 >= Prob ^ 10. Prob = .5012

Given 1000 correct predictions in 1000 attempts. What minimum probability is .999 certain? .001 >= Prob ^ 1000. Prob = .9931

In this fashion a relatively good estimate of Prob can be easily obtained given historical data. It is also fairly obvious that if Predictor has a long record of good performance that there is probably some hidden influence at work. Unfortunately, lacking information on a specific Predictor, we are left to speculate on exactly what it might be.

Possible Strategies for A Predictor

Let's now quickly examine some possible methods which might be employed by a sufficiently resourceful and capable Predictor to alter Prob. In each case, if the method fails, Prob will migrate toward .5. While this list is hardly exhaustive, it does contain a pretty good variety of plausible strategies. It should also be noted that a truly resourceful and capable Predictor would employ more than one strategy to guard against the weaknesses in each.

1. ActualChoice made before PredictedChoice

a. Chooser commits to his choice.
b. By some signal, be it telepathic, somatic, kinesthetic, news reels, or whatever, Chooser communicates ActualChoice.
c. PredictedChoice is set to recieved ActualChoice
d. By some method, trap door, time stop, teleportation, or even Star Trek transporter, ActualReward is set to the value indicated by ActualChoice.

This method will work in all cases where Predictor can recieve some signal from Chooser and where circumstances don't prevent setting of ActualReward accordingly.

2. Predictor has precognition of ActualChoice

While this method is essentially the same as #1, PredictedChoice is made before ActualChoice. The odds are improved, however, because Predictor knows something of ActualChoice. This could be done by time travel, precognition, or simply by selecting Choosers with known characteristics whose behavior may be easily predicted.

The success of this method is related strongly determined by the quality of the information gained. For this reason, acting

3. Predictor makes ActualChoice and PredictedChoice

a. Predictor makes PredictedChoice
b. ActualReward is set to value indicated by PredictedChoice
c. By some way, telepathy, coercion, possession, suggestion, programming, or simply being the Chooser, Predictor convinces Chooser to Let ActualChoice = PredictedChoice

This method will work in all cases where Predictor can force Chooser to set ActualChoice to Predictor's specification.

4. Predictor divulges PredictedChoice
This is exactly like method 3 with one major exception. Chooser maintains more free will than in 3. This makes this method inherently less certain than method 3.

Previously Attempted Solutions

Here is a sampling of some attempted solutions which have been proposed by other authors at other times. A short comment follows each.

1. Predictor is impossible. Assume chance. Set ActualChoice to maximize ActualReward as though chance is operating.

The vast variety of ways by which a sufficiently resourceful and capable Predictor could guarantee a very successful record casts this possibility deeply into doubt. In fact, many of these same methods are employed every day, even within our limited range of experience.

2. PredictedChoice is already set. ActualChoice cannot affect PredictedChoice. Set ActualChoice to maximize ActualReward as though chance is operating.

This reasoning is sound except when faced with a case where PredictedChoice transcends time or where there is some control involved. In other words, it will clearly fail in cases where ActualChoice affects PredictedChoice or where ActualChoice is largely at the discretion of Predictor.

3. Predictor controls Chooser. ActualChoice = PredictedChoice. Therefore ActualReward will be optimized for both players.

This is potentially the least advantageous strategy from Chooser's viewpoint. For this reason, the control must be broken if Chooser is to have any hope of equity given a non-altruistic Predictor.

4. Assume Chooser knows PredictedChoice. Set ActualChoice to value most advantageous to Chooser. Follow same reasoning even though Chooser doesn't know PredictedChoice.

This is akin to asking why a player in a 5 card stud poker game behaves differently than in a similar game with all cards visible. In each case, missing information forces a different line of reasoning than would be followed otherwise.

5. Chooser always acts in a certain manner when confronted with this type of problem. Predictor will use this information to set PredictedChoice.

This is a perfectly reasonable approach if Predictor uses this type of information in setting PredictedChoice. As we have seen there are other, more reliable, methods which Predictor could apply.

Conclusions:

We have examined a rather simple set of 2-player Game-Theory problems in which one player attempts to predict the behavior of the other. We have developed a system by which Chooser may maximize his expected reward from such a game. Furthermore, we have demonstrated how to determine the odds of such a game given historical data of Predictor's ability and speculated on methods Predictor may employ to set these odds in his favor. Finally, we have examined some previous attempts at this problem.

At this point we will demonstrate the formalism by attacking a rather famous special case known as Newcomb's Problem.

```
Given.
   Let PotentialChoices = {Box1, Box2}
   Let PotentialRewards = {1000, 0, 1,000,000}
   Let PredictedChoice be a subset of PotentialChoices
   If PredictedChoice = {Box2}
      OfferedRewards = {1000, 1,000,000}
   otherwise
      OfferedRewards = {1000, 0}
   Let ActualChoice be a subset of PotentialChoices
   if ActualChoice = {}, ActualReward = 0
   if ActualChoice = {Box1}, ActualReward = 1000
   Assuming 1000 correct trials, we are .999 certain Prob > .9931
   if ActualChoice = {Box2}
      ActualReward = .9931(1,000,000) + .0069(0) = 993,100
   if ActualChoice = {Box1, Box2}
      ActualReward = 1000 + .0069(1,001,000) = 70,069
   therefore Let ActualChoice = {Box2}
```

While this has not been a terribly strenuous exercise, there is an incredible amount of work remaining to be done:

1. The theory should be expanded to allow Choosers to also be Predictors. By developing such a Duo-Predictive theory, problems such as The Prisoner's Dilemma would become tractable.

2. The theory should be enlarged to encompass multiple Predictors and multiple Choosers. This would enable simple market economics to be derivable from the theory.

3. A much more complicated reward system needs to be incorporated which will enable considerably more difficult problems in ethics, economics, political science to be solvable.

The first thing we note about the preceding paper is that it invokes certain mysterious and widely contended issues in logic and probability, known collectively under the heading *confirmation theory*. However, before we embark on a detailed treatment of these issues, a few preliminary remarks may be useful. These will be made in order of reference.

While a distinction has been made between the predictor and the chooser, this should not divert us from the realization that each player is attempting to predict the thought and behavior of the other. Without a prior determination on the level of computation employed by each, the distinction is merely that between (time-relativized) first and second play. That only the second player can win money is irrelevant, since the subjective utility of each is fully at stake...and money is only a concrete generalization of utility after all. The situation is reflected in the fact that the metagame payoff matrix given in Noesis 45 is symmetrical with respect to this distinction. The theory of metagames thus serves as a basis for the extension suggested in (1), (2), and (3) on the last page. It was designed for games in which utility is enhanced by cooperation, and its first celebrated application was reportedly to the prisoner's dilemma itself. A version of it was applied in the last issue to answer a question about demonic competition.

Next, the chooser has four, and not three, potential rewards. Where the "relatively minor reward" R1 is $1000, R2,1 must be $0, and R2,2 must be $1,000,000. Where the predictor is considered potentially fallible, the chooser might also win (R1 + R2,2), or $1,001,000. But this is so minor a point that its mention almost bears an apology.

It is stipulated that R2,1 is significantly less valuable than R1. Under the heading "Minimalist Choices", we find the condition "if R1 < 0 and R2,1 > 0 and R2,2 > 0..." which is superficially in violation of the primary condition R2,1 < R1. Given that these cases deal with negative (subzero) rewards amounting to losses or penalties, consistency requires that we restate the primary condition in terms of absolute values: |R2,1| < |R1| < |R2,2|. We might also interpret this passage in terms of information; the inequalities make as much sense if we equate "<" to "=" and let the R( ) stand for the amounts of information available to the chooser concerning the corresponding rewards. But we are merely speculating, and only the author can be sure of his meaning.

Next, the move of the predictor "randomizes" the outcome of the game, resulting in an empirically derivable distribution of outcomes. But the statistical parameters of this distribution need not be so-derivable, and the "Prob" function is thus oblivious to them. That is, the chooser has only limited empirical access to the distribution, of which "Prob" is merely an average meant to conceal the chooser's ignorance of what distinguishes one trial from another. The distinction between "Prob" and the distribution from which it derives disappears in the limit Prob = 1, which is a condition of Newcomb's problem. Below this limit, we have "the most complicated case" 0 < Prob < 1.

The above paper distinguishes itself from *The Resolution of Newcomb's Paradox* chiefly in giving a method, "certainty theory", by which the subject may cope with his ignorance concerning the predictor. This ignorance amounts to relativized uncertainty, a computational predicate which the theory promises to counteract by virtue of its very name. It should therefore be noted at the outset that *no such method can exist in any absolute sense.* While certainty theory can apply only within the computative limitations of particular Γ-subautomata, the larger context generated by the paradox need reflect no such restriction. Concisely, "certainty" is a term in glaring need of relativization, and any attempt to rely on a lesser definition of it must lead eventually to failure.

There are a number of ways to reach this conclusion. First, observe that certainty theory involves a probabilistic regression like that associated with Bayesian inference. But while the latter seeks to acquire new (initial) information regarding determinant parameters, certainty theory seeks to bootstrap "new" information from a largely invariant sampling procedure. Although successive trials do indeed provide new information concerning the universe being sampled, certainty theory ignores the inductive process by which this information is used to extend and modify statistical parameters. For practical purposes, these parameters might as well be formally undecidable to the Γ-subautomata they affect. Unfortunately, these parameters define the strategic mechanisms by which Newcomb's Demon succeeds or fails in his ends.

"Certainty" amounts here to the probability of a probability, as derived from the same data and by the same means used to derive its argument. A hypothetical probability is confirmed empirically and used to define a point on a unit line segment, dividing it in the ratio of certainty to uncertainty: the length on one side of the point measures the probability that the final (maxi-confirmed) probability derived by sampling is greater than the present (partly confirmed) probability, and the length on the other side corresponds to the opposite inequality. It matters not whether the hypothetical probability ("Prob") is considered initially correct, since the rate of confirmation - the accumulation of "certainty" - cannot exceed the rate of modification of an incorrect hypothesis; information is information relative to a given transductive syntax. The regression of probabilities of probabilities of...probabilities can either be effected within Γ_0, or it cannot; if not, we have Γ-regression through levels of relative undecidability.

Confirmation theory, which has been treated exhaustively in the CTMU, has been the cause of much puzzlement among a wide range of logicians, philosophers, and probability theorists. It is thus important to realize that "certainty theory" is merely a branch of confirmation theory, and assumes deep meaning only within the CTMU formalism. In Noesis 47, we demonstrated the necessity of relativizing quantum uncertainty, and its collapsative determination, to the cognitive syntaxes of informationally-relativistic automata. We must do no less for its complement, certainty. The CTMU, which has already been used to resolve the most vicious and intractable paradoxes known to logic and science, is utterly indispensable for all such purposes. So the *Resolution*, and the associated CTMU, encompass any theory to which such paradoxes relate. There can be no "larger solution", now or ever.

Consider the application of certainty theory to the following hypothesis: "There is no Γ_0-effective principle which is not Γ_0-distributive." (Paraphrase: there are no nonlocal physical causal mechanisms.) Prior to Heisenberg's mensural diagonalization of physical quantum determinacy and the EPR/Bell nonlocality experiments, the theory could have been used to demonstrate the virtual "certainty" of this hypothesis, which admits of neither physical nor logical validation. In fact, we might blame "certainty theory" for the delay in the discovery and acceptance of the CTMU, as well as many other useful original theories. For example, the Church once considered geocentrism to be well-confirmed, and Einstein's critics had what they considered endless data attesting to the certainty that the velocities of physical frames sum linearly. What ends up being most "certain" is that axiomatically and methodologically-relative determinations of certainty have too often been summarily pronounced absolute by those who make them, despite the embarrassments of those who preceded them in error. Just one undecidable counterexample, relative to the derivation of a sampling function, is enough to destroy all the "certainty" accumulated by means of such a function with respect to universally-quantified (probabilistic) hypotheses.

Let's have a look at the confirmation theoretic paradox known as *Goodman's Grue,* which is clearly a matter of the computational limitations of human beings. Call an object "grue" if it is green until some future time, at which it will turn blue. Let C be a set of objects, and consider the two hypotheses, "$\forall c \in C: c \supseteq$ green" ("for all objects c in class C: Probability(c is green) = 1") and "$\forall c \in C: c \supseteq$ grue". Note that the Prob = 1 clause is merely the limiting case of Prob = n. Now begin sampling at random from C, and say that a long string of green objects is observed. Since green is indistinguishable from "grue" at this point in time, the "certainty" that class C consists of grue objects rises along with the certainty that C contains only green objects! We appear to be confirming the utterly arbitrary and unfounded hypothesis that the members of C are all going to turn blue by means of some unknown mechanism at some future moment...be they frogs, leaves, emeralds, or hundred dollar bills.

As we illustrated in Noesis 46 using a farfetched menagerie, our total uncertainty as to the existence of the green-to-blue mechanism postulated in the definition of "grue" renders us unable to infer "grue-ness" from the probabilistic data in question. The mechanism is an interstratum "cut" severing the green and blue subpredicates of the composite predicate grue. The green component is Γ_0-decidable; the blue component is Γ_0-undecidable prior to its Γ_0 observational "collapse" via the interdeterministic mechanism, and is no better known to us than the state of a physical quantum before we have measured it. Similarly, predicates relevant to predictive games may be Γ_0-undecidable and therefore inconfirmable by means of (first-order) certainty theory.

Thus, "certainty theory" is a bit of an oxymoron. As Gödel took pains to demonstrate, "certainty" and "theory" combine to form "incompleteness", which stands for uncertainty with respect to theoretically undecidable predicates. Since such predicates may have everything to do with games like Newcomb's, we are merely trading one kind of critical ignorance for another. If, at a given time, we cannot possibly acquire additional critical information by regressing within Γ_0, we must do so in the orthogonal sense... through successive Γ control levels. While the information thereby acquired may be disappointingly inspecific, it can be instructive concerning the potential capabilities of "higher entities" like Newcomb's Demon.

Mr. Dicks himself remarks that players "lacking information on a specific predictor...are left to speculate on exactly what (the hidden influence) might be". Demonic volition and its expressive mechanisms are "hidden influences", and we have already shown that all such influences must conform to an unspeculative master syntax, that of Γ. So it is the CTMU, and not "certainty theory", which better encompasses the theory of predictive games. This is only natural, since the CTMU is a general theory of that logical universe in which "predictive games" play an integral part.

The section entitled "Possible Strategies for a Predictor" contains several terms which have figured prominently in recent discussions. (1) considers the possibility of a "signal". Signals propagate in time, and time entails order. In #48, we described a stratification of ordertypes in which our power to differentiate (count) can be overwhelmed from above; the dynamical timetype in which we formulate distinctions exists within a higher, continuous timetype in which it may be arbitrarily extended and re-ordered (e.g., by injection of "diagonal elements" like that defined by Cantor). The hierarchy of computative timetypes is thus loosely analogous to the Cantorian ordertypic stratification. Signals must be defined relative to the timetype(s) in which they propagate. By the same token, any transmission of information - be it "telepathic, somatic, kinesthetic, news reels, or whatever" - is temporal, and subject to stratificative distinctions. These are critical and can under no circumstances be shrugged off as irrelevant or unimportant. That is why our optimum analytical vantage remains the CTMU syntaxification of prediction and control.

In (2), odds are relativized to the predictor's knowledge. This reflects the fact, which I have repeatedly stressed, that probabilities are meaningless without formulative relativization.

In (4), free will is tacitly equated with reduced certainty. As certainty must be relativized to the syntaxes of derivation of sampling functions, so must free will (this point was originally made in *The Resolution of Newcomb's Paradox)*. So free will too is meaningless without relativization, and the CTMU - which is the first and only theory in which this can be accomplished - again dominates any lesser approach.

Under "Previously Attempted Solutions", it is observed that "the control (of chooser by predictor) must be broken if chooser is to have any hope of equity given a non-altruistic predictor." The breaking of control relationships is closely related to the question of demonic competition treated in the last issue. It is also subject to a generalized form of uncertainty, *Γ-uncertainty,* derived as a structural property of Γ. It reflects the ubiquity of undecidability in Γ, and can be problematic for choosers seeking an absolute upper hand over the demons controlling them (or, by prediction and algorithmic regression, their outward destinies).

The proferred solution of Newcomb's problem reflects the asymptotic convergence of the expected utility of C1 on $1,000 as $S_w/(F_w+1) \longrightarrow$ infinity and Prob $\longrightarrow 1$ (where S_w, F_w are the numbers of past predictive successes and failures known to the chooser). It is not a "terribly strenuous exercise" because it omits many of the logical complexities of the problem. It is these of which we must not lose sight if we hope to achieve deep understanding.

Regarding conclusion (1), we have already mentioned the symmetry of the metagame matrix with respect to the chooser-predictor distinction. Regarding (2), economies are characterized by strategic functions in which both competition and cooperation come into play simultaneously. The cooperation factor regresses to encompass the entire economy, and requires a treatment analogous to the theory of n-ary metagames. Regarding (3), the intersyntax translation of utility functions is indeed a matter of great complexity. Because the situation is relativistic, it calls unequivocally for the CTMU resolvency of intersubjective paradox.

The foregoing remarks are not meant to detract from the merits of Mr. Dicks' paper. Despite the inadequacies it shares with other methods of its kind, certainty theory does give provisional confirmation of some probabilistic hypotheses (that is, of probabilities among the successive instances of which there exist uninterrupted dependency relationships analogous to physical causation), at least in the majority of decision-theoretic situations. Even where undecidable predicates defined on the unpredictable volition of demons are consistently active, certainty theory confirms them by their recurrent (Γ_0-pseudorecursive) effects; this happens to be so for Newcomb's Problem. But were a demon to play insincerely for a number of trials, winning and losing "at random", he could still win at will in a manner to which certainty theory is blind.

I'm sure the other members will agree that George's paper has been the occasion of even greater insight than before, and we may therefore express our unreserved gratitude for his input.

I have just received a letter from Ronald Hoeflin expressing his need to address logistical matters like subscription renewals and a possible annual meeting. These will be taken up in the next issue, which either he or I will be editing.