Philosophy 110W - 3: Introduction to Philosophy, Hamilton College, Fall 2007
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I. Recapitulation

We have cornered the growling, skeptical dog.
In part, we have done so by using our Rod(erick Chisholm).
That is, we put aside worries about justifying the principle of the uniformity of nature, and have just started looking at the actual processes of science.
Hempel described a deductive-nomological (D-N) model of explanation.
We use covering laws, however we discover them, and initial conditions to explain particular events.

II. The D-N model and lower-level laws

The D-N model not only explains specific instances in terms of general laws.
We can also use it to explain lower-level laws by higher-level laws.

Carnap focuses on the generation of higher-level laws through the experimental method.
The experimental method seeks covering laws.
The higher the level of these covering laws, the more variables are considered.
Lower-level laws concern only a few variables.

To pursue the laws, we isolate relevant factors, trying to keep some factors constant, while varying others.
Boyle's Law: $P_1V_1=P_2V_2$, is a low-level law, because we keep the temperature constant while varying pressure and volume.
Similarly for Charles's Law: $V_1/T_1=V_2/T_2$.
On the other hand, the ideal law of gases is a higher-level law, combining results of the two: $PV=kT$.

Notice that we can explain the lower-level laws in terms of the higher-level law.
Hempel uses the example of how gravitational law explains Galileo's law regarding free-falling bodies.
Galileo took the acceleration of a free-falling body to be a constant.
Newton's law of gravitation shows that Galileo's law is false, but is also pretty close to a special case.
Thus, having a D-N explanation can be useful both in explaining particular phenomena and particular laws.
But, problems arise for determining the best explanations.

Normally, we want to discover the highest-level laws available.
In particular explanations, though, we generally do not need a high-level covering law.
We can make do with a minimal covering law.
Newton's gravitational law, for example, applies to interactions among all massive bodies.
But, to explain the falling of, say, the keys on the table, we do not need a law which is so broad.

We could appeal to the general law of gravitation, or to a less-general law which applied only to, say, the gravitational pull of the earth on these keys.
Such a minimal covering law would provide a D-N explanation, but would still be unsatisfying.
So, having the D-N form does not suffice to make an explanation satisfying.

III. Problems with the D-N model and determining the laws

One problem is that our experiments only confirm the most minimal covering law.
The dog in the corner is growling again, but we are concerned here with explanation, not the origins of the laws.
Still, we were hoping that all we had to throw the dog was the principle of the uniformity of nature.
To construct a good D-N explanation, we need laws.
Now, it looks like even if we assume nature to be uniform, there may be problems with constructing the laws.
There are many statements which look like laws, but which are not really laws.
Carnap, Hempel, and Goodman all discuss problems that arise for determining laws.

Carnap worries about excluding irrelevant factors.
For example, if some one thought that the relationship among pressure, temperature, and volume of a gas were affected by the location of Jupiter in orbit, one would have to rule out that factor.
We can not assume that the location of Jupiter has no effect.
We must formulate experiments to rule it out.

Goodman points out the similarity between two instances and hypotheses.
A piece of copper on my desk that conducts electricity confirms an hypothesis that all copper conducts electricity.
And, it increases our confidence that future pieces of copper will conduct electricity.
But it does not confirm the hypothesis that anything on my desk will conduct electricity.
That a person in a room is first-born will confirm the hypothesis that all persons in a room are first-born.
But, it will not increase our confidence that future people in the room will be first-born.

Hempel presents a criterion to distinguish statements which look like laws but are actually not laws, from actual, law-like statements.
If we wanted to explain why every one in this room is under 50, we might appeal to a statement like:

> L: All persons in this room are under 50 years old.

From L, and the specific case of some one in the room right now, we can derive that any one here is under 50.
But, L will not support counterfactual instances.
If a person over 50 came in to the room, the law would no longer hold.
Note further, that L and the specific case do not seem like an explanation.
So, laws must be more than general statements which combine with specific cases to yield instances.
They must support counterfactuals.

IV. Hempel's paradox of the ravens

Even if we had a good specification of general laws, there remains a problem of specifying what an instance is.
Hempel presents one worry about instances of general laws, quite quickly.
Consider 'all ravens are black'.
What would be instances of this law?
Presumably, the instances would be ravens.
And, if they are all black, the law would be confirmed.
Unfortunately, 'all ravens are black' is logically equivalent to 'all non-black things are not ravens'.
In this case, the instances look like anything that is not-black.
So, a red pen, since it is not a raven, seems to confirm the claim that all ravens are black.

The problems for specifying laws and their instances are even worse, as Goodman shows.

V. Three problems of induction

I1. Weak problem of induction:
We have limited intelligence and experience.
There is not enough evidence to discover the highest-level unifying laws.
If we were smarter or had more time, we might solve I1.
This is not the Hume/Skyrms problem of induction.
This problem is just a problem of limitations on evidence.
Sometimes there are two or more equally well-supported theories about the world, theories which agree on all the empirical evidence we have gathered.
Even if we presume that physical laws will be uniform and stable, we do not know which theory to use.
The weak problem is solved by gathering more evidence.
It is not really a philosophical problem.

I2. Strong problem of induction:
Even given all possible evidence from the past, we can not know that the laws of nature will not shift radically and unexpectedly.
This is Hume's problem of induction.
We do make successful predictions, despite I2.
Consider dropping a book in mid-air.
Prediction #1: The book will rise.
Prediction #2: The book will fall.
We predict the latter, even if experience does not support this.
The strong problem of induction is Hume's worry that we can not know that the laws of nature will remain uniform and stable.
We presume that they will, but this is unjustified.

I3. New Problem of Induction
The 'New Problem of Induction' gets its name from Nelson Goodman.
You know what it means for an object to be green.
Consider the property called 'grue'.
An object is grue if it is green until 1/1/2010, when it suddenly turns blue.

How can you tell if a plant, or an emerald, is green or grue?
All evidence for its being green is also evidence for its being grue.
Green things and grue things are exactly alike until 2010.

One objection to grue is that it is not simple, or uniform, or "purely qualitative" (271-2).
But notice, grue is complex only if we start with the predicates green and blue.
Consider that something is bleen if and only if it is blue until 1/1/2010 and then turns green.
If we start with grue, then an object is green if and only if it is grue until 1/1/2010, and then turns bleen.
And, an object is blue if and only if it is bleen until 1/1/2010, and then turns grue.
That is, we can define green and blue in terms of grue and bleen just as easily as we can define grue and bleen in terms of green and blue.

The new problem of induction shows that Hume's problem is not just about physical laws, but about common terms we use to describe the world, too.
One could construct other artificial properties, like the property of being a papod.
A papod is a piece of paper which, on 1/1/2010, turns into an Ipod.
All papods look exactly like pieces of paper right now.
There is, in principle, no way to tell them apart.

Hume's problem of induction was to justify that hypotheses which were confirmed in the past would continue to hold.
Goodman's problem of induction is to figure out which hypotheses are really confirmed in the first place.

Here is a nasty poem about Goodman's new riddle:

Nelson Goodman seems quite keen
Induction yet to show anew
Is somewhat sick as will be seen
And may not be completely true.

Is this leaf a lovely green?
Or is it rather colored grue?
Is the sky above quite bleen?
Or am I right in seeing blue?

I really don't care to be mean
And have no wish to Goodman skew;
But childish puzzles can demean;
Has he nothing else to do??
http://www.massline.org/PhilosDog/G/Goodman.htm

As Goodman notes, following Hume, we really do not have practical worries about the problem of induction.
But, the problem is a profound one, philosophically.