My thesis is that there are good reasons for a philosophical account of measurement to deal primarily with the properties or magnitudes of objects measured, rather than with the objects themselves. The account I present here embodies both a realism about measurement and a realism about the existence of the properties involved in measurement. It thus provides an alternative to most current treatments of measurement, many of which are operationalistic or conventionalistic, and nearly all of which are nominalistic. This enables the present account to give better explanations of a number of features of measurement and other aspects of science than competing accounts of measurement can, and to be more readily integrated into a realist account of natural laws and causation. It also illustrates a general strategy for combining a familiar and powerful approach to representation with intensional entities like properties, which I think can be useful for dealing with a number of philosophical problems.

In Section I, I explain what I mean by realist theories of measurement and of properties, and defend each. In Section II, I argue that the influential representational approach to measurement provides a useful method for developing the ideas sketched in the first section, and I briefly recall its general features. In Section III, I adapt this approach so that the things represented are properties, for example various magnitudes of length and mass, rather than individual physical objects. I will be more concerned with metaphysical issues than with formal ones, but for purposes of illustration I will sketch a formal language for dealing with properties and formulate a standard set of axioms for extensive measurement in it. For simplicity, my examples will usually involve familiar properties and relations like length, rest mass, and subjective preference, rather than more exotic ones like gravitational-field intensity or the energy-momentum 4-vector, but if the account proposed here is on the right track, it will apply to a fairly wide range of properties and a variety of types of measurement. In Section IV, I examine ways of extending this approach and urge that, since it provides a method for characterizing various aspects of the structure of
the world, it should be useful for dealing with a number of issues in
metaphysics and other areas of philosophy. Because my concerns are
with metaphysical issues, I will focus on the more abstract aspects of
measurement, but this is not intended to suggest that other aspects are
less important.

I. MEASUREMENT, PROPERTIES, AND REALISM

What realism in general amounts to is notoriously obscure, but I think
that many of the issues concerning measurement and properties that
divide the realist and anti-realist can be made clear enough for present
purposes. Three sorts of realism will be important here: realism with
respect to measurement, realism with respect to properties, and realism
with respect to theoretical entities in science (scientific realism). I do not
want realism about measurement to be formulated in a way that pre-
supposes realism about either properties or theoretical entities, and so I
will first defend it using more-or-less observational magnitudes like
length and without assuming that magnitudes are properties in any full-
blooded sense.\(^2\) I will then argue that the best way to develop a realist
theory of measurement is to employ a realist account of properties. I do
not regard my arguments here as demonstrative — I don’t think that de-
monstrative arguments are to be found in many areas of philosophy —
but I believe that their cumulative force is sufficient to motivate
the development of a realist account of measurement in terms of
properties.\(^3\)

Anti-realism with respect to measurement can assume a variety of
forms. The simplest is an austere operationalism of the sort expressed
by the refrain that intelligence just is whatever intelligence tests mea-
sure. The idea here is that terms like ‘intelligence’, ‘length’, and ‘tem-
perature’ do not stand for objective things in the world, but derive their
meaning entirely from our measurement practices. According to an
extreme version of the doctrine, the only objective facts about length,
for example, are grounded in the ways in which we use rulers or other
instruments to order objects and assign numbers to them. This outlook
is a species of a more general and widespread view, according to which
the fundamental facts about measurement are grounded in conventions
about the way scientists use words like ‘length’, what they are willing to
count as a measurement of length, and so on, rather than being rooted
in objective facts about length itself (as in [43], 130ff.).