Introduction

In the second century of the Christian era, a mathematician and astronomer from Alexandria devised a geometric system to account for the movement of the seven known heavenly bodies which traversed the firmament of the fixed stars. His name was Claudius Ptolemaeus, but he is commonly referred to simply as Ptolemy.

Ptolemy's fundamental assumptions were that the earth was stationery and that the sun, moon and "wanderers" or planets revolved around the earth in circular orbits. They had to be circles, Ptolemy further assumed, because the planets coursed through the heavenly realms of divine perfection, and the circle is a perfect geometric figure.

Mathematically, the system he devised to account for the appearance of day and nighttime skies was fairly accurate, and it needed to be adjusted only to account for the occasional backward motion of Mars, Jupiter and Saturn. To make this mid-course correction, as it were, Ptolemy introduced smaller circles or epicycles on which the planets actually rode, while the epicycle itself moved along the circular path originally reserved for the planets themselves.

For over a thousand years, the Ptolemaic system stood unchallenged. Farmers, navigators and astrologers used Ptolemaic charts to predict the seasons, to plot the courses of ships and to analyze the effects of planetary conjunctions on earthly events. From any position on the chart, one could mathematically calculate where a planet would have been in the past or would be in the future.

Almost. As a matter of fact, there were slight inaccuracies in the system which understandably began to show themselves the longer the system was in use. To account for these deviations from circular perfection, later astronomers introduced further epicycles added on to the original epicycles, until the system began to resemble a confusion of intersecting curves rather than the divine elegance which Ptolemy had first envisioned.

Not until the sixteenth century did any astronomer suggest that a better way to "save the appearances" would be to devise a completely different system, one which put the sun at its center and made the Earth one of the planets rather than the focal point of all heavenly radii. The scientist who first proposed this new system was Nicholas Copernicus. Even though he died before his system could be verified by the more accurate observations of Galileo and Kepler, he is credited with having wrought the first scientific revolution.

Since then, the term "Copernican revolution" has come to stand for a change in thinking in which the fundamental assumptions of specialists and ordinary folk alike are turned on
end, and in which the old way of looking at reality is turned upside down. In the eighteenth century, the philosopher, Immanuel Kant, referred to his radically new epistemology, according to which the structures of the mind determine the structures of reality, as a Copernican revolution.

In the twentieth century, philosophers have reflected upon the phenomenon of periodic revolutions in thinking. Bernard Lonergan in his 1957 work, *Insight*, called them movements to a “higher viewpoint” which take into account the old data while also explaining the new facts which the old theory neglected. But it was not until Thomas Kuhn published the second edition of *The Structure of Scientific Revolutions* in 1970 that English speaking intellectuals acknowledged the pervasiveness of what Kuhn referred to as "paradigm shifts" not only in the natural sciences but in other theoretical pursuits as well.

Such paradigm shifts occur in three phases. In the first phase, what Kuhn calls "normal science" is done by those who accept the prevailing paradigm and understand the data of their discipline within the mental framework that the paradigm prescribes for them. The work of such scientists consists primarily in applying the concepts in the paradigm to the data and in solving new problems by using the old concepts or concepts consistent with them. The work of Ptolemaic astronomers, for example, was to plot the movements of heavenly bodies on astronomical charts and to calculate past or future positions by extrapolating from their known positions, trajectories and speeds.

The second phase is introduced with the discovery of anomalies, or new data which do not fit the old paradigm. The retrograde motion of some of the planets was one such anomaly which was easily solved by the addition of epicycles to the perfectly circular orbits, but data collected over centuries increased the number of adjustments that had to be made until the whole system strained under numerous calculations and recalculations. In the absence of a better explanation, however, anomalies continue to be treated within the boundaries of normal science.

Finally, the third phase is the introduction of a new paradigm or a new theoretical framework for interpreting the data, which includes not only the traditional data which were satisfactorily accounted for under the old paradigm but also the anomalous data. In Renaissance astronomy, this phase was the introduction of the Copernican or heliocentric theory which eventually displaced the Ptolemaic or geocentric theory.

Although this displacement is easy to understand after the fact, it initially encounters intellectual and social resistance. Anticipating such resistance, Copernicus postponed publishing his theory until he was lying on his deathbed. Galileo more naively assumed that men of science would be persuaded by the facts, but when he used his telescope to show that Jupiter had moons (an anomaly that ran counter to the Ptolemaic assumption that there had to be only seven moving bodies in the heavens), he was rebuffed with the comment that his instrument was obviously bewitched. Undaunted, Galileo published his version of the heliocentric theory, only to be tried and convicted of heresy.
The analogy between astronomy in the sixteenth century and theology in the twentieth century can be drawn by anyone who is conversant with the history of theology prior to and following the Second Vatican Council.

As early as the turn of the century, Catholic intellectuals who were familiar with developments in the natural and human sciences saw that some of these advances were incongruous with the Aristotelian paradigm within which Catholic thinking had been proceeding since the Middle Ages. From the viewpoint of scholasticism, incompatible data provided by geology and biology, history and literary criticism were anomalies. The philosophers and theologians who attempted to suggest a new paradigm for Catholic thought, however, were branded as modernists and condemned by the hierarchy.

Gradually, however, even data which supposedly should fit within the scholastic paradigm were providing anomalies that suggested a need for some revision. Historical data on the liturgy, for example, demonstrated that not only had liturgical forms evolved over the centuries before the Council of Trent but also that sacramental theology had tolerated diversity of thought during the patristic era. In addition, biblical data gathered with the Vatican's approval since Divino Afflante Spiritu in 1943 suggested that the simple distinction between the literal and figurative meanings of a text was no longer adequate to accommodate the range of potential interpretations made possible by modern biblical scholarship. Like the Ptolemaic system before it, the scholastic system was straining at the seams.

Very prudently, the bishops at the Second Vatican Council did not attempt to develop a new theoretical paradigm for Catholic thinking. Instead, using a combination of biblical and secular terminology, they described the data which any new system would have to account for and pastorally prescribed the direction that the Church should move toward. The very fact that the Council did not overtly endorse the scholastic system, however, gave Catholic thinkers permission to search for other paradigms in their analysis of theoretical and practical problems.

At the beginning of the third phase of the most recent paradigm shift in Catholic thinking (which is to say, from the middle to late 1960s), the emerging new paradigm seemed to be the critical Thomism of Rahner, Lonergan, Schillebeeckx and other rather weighty intellectuals. By the end of the 1970s, however, it was becoming clearer that this neo-scholasticism was in competition with other new thought systems which were then beginning to emerge. Biblical and liturgical studies were developing languages of their own, ecumenical dialogue and the charismatic movement prompted borrowings from Protestant thought, philosophical interfaces gave rise to existential and process theology, pastoral concerns led to thinking within psychological and sociological frameworks, and sensitivity toward the poor and the marginalized led to the development of a new method of theologizing which expressed itself as liberation theology.

At first, this proliferation of explanatory paradigms seemed to belie the expectation that what was occurring was a shift from the "normal science" of scholastic theology to another
system which would eventually replace it. In the 1980s, however, it became clearer that
the new system was indeed emerging, but that it was very different than anticipated.
Instead of being a new, comprehensive synthesis, it was a paradigm of simultaneous
pluralism, or a plurality of co-existing systems.

For those familiar with contemporary developments in the human or social sciences, this
ought not to be surprising. There was a time in the emerging human sciences of the mid-
twentieth century that the goal of research was assumed to be a single over-arching theory
which would prove to be the truest among competing hypotheses. In psychology, for
example, Freudians competed with neo-Freudians, existentialists, behaviorists and other
schools for the honor of revealing the ultimate truth about the human psyche. But now in
the latter decades of this century, except for a few diehards and ideologues, few
psychologists accept this description of their field. The new goal seems to be the
simultaneous development of multiple models of psychic activity in order to understand a
human reality which is too complex to be completely comprehended within a single model.

Arguably, a parallel development has been occurring in theology. Whereas prior to the
recent ecumenical council theologians and their schools sought to prove themselves correct
to the exclusion of their rivals (especially their rivals in other churches), the majority of
theologians today seek to contribute to an ongoing collaborative attempt to understand
faith and religion from viewpoints that are not necessarily mutually exclusive even if they
cannot be simultaneously employed. Again, the assumption seems to be that the divine
and human realities probed by theology are too complex and variegated to be simply
subsumed within a single set of categories, and that therefore multiple theological models
are required.

Needless to say, not all contemporary thinkers appreciate the necessary pluralism of
contemporary theology. Some still yearn for the "good old days" when truth was one and
error multiple. And since some of these hold positions of ecclesiastical power, they claim
the authority to pontificate about debatable issues, and they use their authority to stifle
those who point out anomalies in the once-reigning paradigm or who choose to work
completely within alternative models. One might as well try to stop the motion of the earth
by condemning it as heretical—though, of course, this too was once tried.

The Situation in Sacramental Theology

Applying Kuhn's developmental schema now to recent developments in sacramental
theology, we can again discern the three phases of normal science, the uncovering of
anomalies and the emergence of an altogether new paradigm.

The normal science of the sacraments from the Middle Ages to the mid-twentieth century
was, of course, scholastic theology. Interestingly, although this branch of theology was
developed in the Sententiae and Summae as part of dogmatics or systematics, it was
eventually treated in nineteenth and early twentieth century manuals as part of canon law
since the main problems with the sacraments had to do not with understanding them
correctly but with administering and receiving them correctly. This coincides completely
with the prevalent concern of any normal science, which is solving problems that arise within an already accepted paradigm.

The anomalies which eventually challenged the scholastic paradigm were at first not perceived as anomalies since they appeared in historical investigations and the scholastic system was conceptually ahistorical. As time went on, though, the system had to be adjusted to account for the new data. Liturgical studies uncovered developments in the early and medieval history of the sacraments and their theology, and these developments were accounted for as steps leading up to the fullness of the Tridentine sacramental system and the perfection of scholastic theology.

In a similar manner, biblical studies increasingly suggested that many of the proof texts used by the scholastics to buttress Catholic interpretations of the sacraments had been taken out of context, but these anomalies were dismissed by employing a distinction between scriptural and dogmatic theology.

Insurmountable anomalies did not emerge until the Second Vatican Council called for a revision of the sacramental rites and a restoration of a style and understanding of liturgical celebration more reminiscent of the patristic age than the middle ages. At the same time, the Council pointed out the desirability that people worship in their own language and in forms appropriate to their own culture. And if that were not enough, at the very same time, widespread social changes were accompanied by revolutions in people's ways of thinking and behaving. Within a few years, altars were turned around, everyone was going to communion, no one was going to confession, marriage was becoming statistically less permanent, anointing was not just for the dying, ministry was not just for priests, baptism was supposed to be for adults, and no one knew for certain what to do with confirmation.

Clearly, the scholastic paradigm was no longer adequate to explain the sacraments as practiced, and the time had passed when the system could be patched up with the theological equivalent of a few more epicycles. A new paradigm had to be found.

Concomitant with the experimentation that was characterizing the introduction of the revised liturgical rites, a noticeable amount of exploration characterized the theological attempt to explain the revised liturgy and sacraments. As indicated earlier, the initial leaders in the new theology were primarily variants of neo-Thomism, since the writings of Rahner and Schillebeeckx had been instrumental even before the Council in convincing the bishops that change did not necessarily entail a betrayal of tradition. Within a short time, however, additional contenders made their own attempts to explain the Catholic sacramental rites within other philosophical and theological frameworks, the more noteworthy of which were existentialism and phenomenology, process thought, charismatic theology and liberation theology.

These initial attempts to discover an alternative to the scholastic paradigm were traditionally oriented in the sense that they each proposed a system of thought which purported to be able to eventually provide a complete explanation of all the data on the sacraments. Even if individual authors are somewhat more modest in their claims, the
implication of a systematic approach is that eventually, if the system is adequate to the task at hand, it can and should replace less adequate competitors. Attempts such as these were typical of most of the sacramental theology done through the 1970s.¹

A quite different and nontraditional approach also made its first appearance in the 1970s, when some Catholic thinkers began to employ categories from the social or human sciences to understand and analyze Christian sacramental rituals. Anthropologists had long analyzed non-Christian rituals in terms of their symbolism and meaning, their internal structure and their social function, but now their tools of conceptual analysis began to be turned on Christian rituals as well. In addition, works on the psychology and sociology of religion began to be mined by Catholic theologians for further insights into the effects of ritual on the individuals and groups who participate in them.²

The fuller fruits of this interface between theology and the human sciences did not begin to appear, however, until the 1980s. In From Magic to Metaphor, George Worgul collected much that had been done in the sciences during the two preceding decades and applied it to the sacraments. In Sacraments and Sacramentality, Bernard Cooke produced a theological synthesis in large measure grounded in reflection on the human experience of friendship and the transforming power of ritualized symbols. Most of the volumes in the Michael Glazier series, "Message of the Sacraments," included insights drawn from psychology and sociology as well as history to better understand the individual sacraments in their contemporary setting. The Liturgical Press series entitled Alternative Futures for Worship went even further in envisioning possible developments in sacramental practice based on knowledge gleaned from the human sciences. And the collection by Mary Collins which appeared as Worship: Renewal to Practice contained a number of articles analyzing the concrete performance of rituals in order to discover what they actually mean for those who participate in them.³

The above works and others which were published in the 1980s represent the emergence of a new genre in the literature of sacramental theology. In terms of Thomas Kuhn's Structure of Scientific Revolutions, they point towards a new paradigm for understanding liturgy and the sacraments, that is, they indicate the development of a new frame of reference for interpreting Catholic worship as it is experienced and practiced in the Church today.

The New Paradigm in Sacramental Theology

Just as Ptolemy's and Copernicus's systems can be most easily contrasted in terms of obvious differences such as geocentrism versus heliocentrism, the new paradigm in sacramental theology can best be summarized in terms of contrasts between itself and its "normal science" predecessor, scholastic theology.

Although much more could be said, the major contrasts between the two paradigms can be summarized under three headings: differences in approach, differences in presentation, and differences in application.
First, there are differences in approach to the subject matter, which is the liturgy and the sacraments.

If scholastic theology can be characterized as systematic in its approach to topics, the new paradigm could be characterized as non-systematic. This should not be taken to imply that the new approach is unmethdoical, but only that its method does not proceed within the parameters of a single conceptual system. Scholasticism consciously confined itself to concepts contained within or congruent with Aristotelian metaphysics, including concepts that could be generated from a reading of the scriptures and the doctrines of the Church, both those found in ecclesiastical statements and those found in the writings of non-magisterial authorities such as orthodox theologians. The new paradigm, on the other hand, accepts categories that can be found within or generated from any of the human sciences, including history, philosophy (which encompasses many schools of thought), psychology (both experimental and clinical), sociology and anthropology, linguistics, semantics, literary criticism, exegesis and hermeneutics.

In a word, whereas the previous approach was unified within a single philosophical framework, the emerging approach is radically pluralistic. There is no longer a single Catholic sacramental theology but a sometimes competing and sometimes complementary set of sacramental theologies simultaneously in use in the Church today. Moreover, since scholasticism as developed by the time of the Thomistic revival in the nineteenth century had achieved the status of a mature discipline or normal science, it was essentially a closed system: it did not and could not allow for the emergence of questions nor the possibility of answers which did not fall within its purview. In contrast, the new approach is open to as many types of questions and answers as can be formulated within the thought systems that it utilizes as bases for reflection. Whereas scholastic sacramental theology could view itself as fundamentally complete and self contained, therefore, the new paradigm necessarily views its task as perennially incomplete and ongoing. New insights from the human sciences are always raising new possibilities for interrogating and explaining the liturgy and sacraments.

Secondly, there are differences with regard to presentation, that is, with regard to the ways that the Church's rituals are talked about.

If scholasticism can be characterized as being essentialistic in its manner of presentation, the new paradigm can be said to favor a more existential mode of speaking. To say it in another way, whereas traditional sacramental theology was doctrinal and deductive, beginning with doctrinal statements about the nature and number of the sacraments and reasoning to their necessary effects, the new paradigm is experiential and inductive, beginning with liturgical and ecclesial praxis and arguing either to a confirmation or, at times, a disconfirmation of traditional doctrinal formulations about the sacraments.

Needless to say, this manner of presentation is somewhat disconcerting to theological traditionalists who understandably regard the conclusions of contemporary theologians as undermining the very foundations of faith. However, proponents of the new paradigm, inasmuch as they are consciously utilizing the methodology of the human sciences, usually
recognize that their conclusions are limited and tentative, which contrasts sharply with results achieved within the scholastic paradigm, which could usually be regarded as dogmatic and definitive, even when the definitive conclusion was that a particular opinion was not de fide but only sententia probabilior, for example.

A closely related contrast in the manner of presentation is between abstractness and concreteness. Theologians working within the scholastic paradigm could begin with definitions of sacraments (abstractly considered) and deduce effects of sacraments (again, abstractly considered) without ever having to verify their inferences experientially. The easily misunderstood principle of ex opere operato readily led to conclusions in the spiritual realm such as the remission of sins or infusions of grace which had no observable effects and hence could be imputed to have occurred automatically and magically. Theologians working within the new paradigm, on the other hand, often begin with concrete observations or recollections of the performance of sacramental rituals and then try to analyze what is effectively occurring. They also have a strong tendency to contrast actual performance and actual effects with the abstract religious ideals explicit in the text and with doctrinal generalities propounded about the rite and its intended effects.

Because the scholastic approach was systematic, and given the fact that there was fundamentally only one system, scholastic presentations on the sacraments could be systematically descriptive. That is, traditional theologians could work with the self-understanding that they were describing the sacramental system objectively and in the only way that it could be described without falling into heresy. From the perspective of the contemporary paradigm, however, those theologians were utilizing one particular model for understanding ritual events and they were assuming that the model was providing them with a picture of reality as it was. Contemporary theologians acknowledge the existence of a variety of models, some mutually exclusive and some not, some at least verbally congruent with the scholastic model and some not.

Within the new paradigm, therefore, the only assignable meaning of heresy is a statement which is made within the scholastic model or within the general context of Catholic dogmas (which is still basically scholastic), but which is contrary to one or more statements of dogma. Statements made outside the traditional Catholic language game cannot, strictly speaking, be contrary to scholastically formulated dogmas any more than statements made in behavioral psychology can contradict statements made in clinical psychology, even though on the face of it they may seem to be in conflict. Since the same complex reality—whether it be a religious ritual or a secular activity—is being observed and analyzed from the perspective of two different models, statements made within each model can be correct even though their verbalized expressions can appear to be at variance with one another.

Note, however, that the emerging paradigm in sacramental theology (as in all areas of theology) is not one model among others but an over-arching, open-ended set of working models. The paradigmatic assumption is that the human reality of liturgical worship as well as the transcendent realities symbolized and spoken of in ritual are too complex on the
one hand and too mysterious on the other to be completely subsumed within a single system or neatly comprehended within the concepts of a single model.

Third and lastly, there are the differences in the manner of application, that is, in the way that the results of conceptual analysis are applied to sacramental performances.

In a narrow sense, it can be said that scholastic sacramental theology was not at all concerned with performance, since that was the province of canon law. In a wider sense, though, both because the Church's canons were often cast in scholastic terminology and because the manual tradition in theology dealt with the sacraments within the framework of canon law, traditional theology can be said to have been concerned with the performance of the sacraments. None the less, this concern was minimalistic and legalistic, that is, there was concern for the minimum that had to be done in order for a sacrament to be valid, and that concern was expressed in terms of canonical legalities.

Although, again from a narrow perspective, sacramental performance today is more the concern of liturgists than theologians, more broadly speaking, liturgists do engage in theologizing and theologians do make inferences about what constitutes good and bad liturgy. When either group does this, however, they tend to be maximalistic rather than minimalistic, that is, they encourage more to be done rather than less in the celebration of the sacraments, in order that the rituals might have their greatest possible symbolic impact. In addition, while not being totally antinomian, liturgists tend to look beyond the letter of the law in the interest of enhancing the ritual drama and heightening its effect on the participants. The standard by which such performance is measured thus tends to be not legalistic but pragmatic, not was it valid, but did it work.

To say it in another way, while those who operate within the scholastic paradigm are concerned about sacramental products, those who operate within the contemporary paradigm are more concerned with sacramental processes. This is to some extent due to the fact that in scholasticism the focus was on the 
\textit{sacramentum et res}, the sacramental reality that was bestowed through the ritual and received by the recipient. Like being pregnant or not, this was a binary possibility: either one received the sacrament or one did not. The 
\textit{sacramentum et res}, however, as a hypothetical entity, is not found in other models than the scholastic, just as epicycles are not found in systems other than the Ptolemaic. Because of contemporary theologians' interest in experience and concreteness, therefore, their focus is much broader, ranging from concern for the communal and personal situations antecedent to the sacramental celebration to concern for the immediate and long term consequences, if any, wrought by preparation for, participation in and commitments following such a celebration.

\textbf{Copernican Implications and Ptolemaic Residues}

The primary implication of the shift from traditional to contemporary paradigms in sacramental theology is precisely this shift in focus. Deleting the imputed sacramental reality from the vocabulary and conceptuality of theoretical models simultaneously deletes talk and thought about administering and receiving sacraments as metaphysical entities. Although one still finds these phrases in popular and ecclesiastical usage, they are
becoming increasingly scarce and increasingly inoperative in theological literature. That is, they no longer function as explanatory concepts; they are atavistic remnants of an earlier use of language, just as one still speaks of the sun rising and setting even though one knows that the sun is stationary relative to the spinning earth.

Properly speaking, therefore, outside the scholastic paradigm, sacraments are neither given nor received. There is simply nothing that corresponds to the *sacramentum et res* in many contemporary sacramental theologies, just as there is nothing that corresponds to the four humours in contemporary psychology. Nor is it the most felicitous use of words to say that sacraments are celebrated, even though that phraseology has become increasingly popular during the past twenty-five years. Properly speaking, the sacraments *are* the celebrations, or what were called in the scholastic system *sacramentum tantum*. What is celebrated in and through a sacramental ritual is not itself but something other than itself which is symbolized by the words and gestures of the rite. Just as a birthday party celebrates a person's completion of a year of life, and just as a national holiday celebrates some cultural reality in the nation's life, so the sacraments celebrate the Christian mysteries that are being lived by individuals and communities.

In a period of transition such as ours is, however, one cannot expect that old language and thought patterns would instantaneously transmute into the new. In fact, one weighty reason why the old language lingers with such tenacity is that it is enshrined in the Code of Canon Law. Even though the Code was substantially revised in 1983, and even though the sections on the sacraments reflect the many changes in the liturgy mandated by the Council, the theology implicit in those sections remains substantively scholastic. In canons 842 and following, one repeatedly finds such phrases as administering or conferring the sacraments, as well as receiving the sacraments. Moreover, the Code explicitly refers to the imprinting of a character (which is a species of sacramental reality) by baptism, confirmation and orders. Until the language and conceptuality of the Code are changed, one cannot expect the hierarchy and the Roman magisterium to change their thinking.

Additional Ptolemaic residues can be discerned in certain magisterial attempts to "save the appearances," which in this case means preserving the integrity of the scholastic sacramental system, sometimes at the expense of pastoral needs within the Church. The insistence on confession before first communion, the strictures placed on the conferring of general absolution, the prohibition against women's ordination, the necessity of an annulment before a second marriage, and the restriction of the anointing of the sick to administration by presbyters are all, to a greater or lesser extent, related to constrictions placed on the magisterium's thinking by the limitations of the scholastic paradigm.

One of the pervasive consequences of the current revolution in sacramental theology is the inability of parties operating within the mutually exclusive paradigms to communicate with one another. As an intellectual state of affairs, this does not disturb thinkers who work with models in the pluralistic, open-ended paradigm, but it is of some significant concern to thinkers who use the scholastic model either primarily or exclusively. As a practical state of affairs, therefore, this inability to communicate due to the mutual exclusivity of
explanatory language games can have disturbing results when theologians who have less political power are verbally harassed or academically attacked by the politically more powerful hierarchy.

One practical implication of recognizing this reality is that the majority of contemporary theologians have to be cautious about their language and to avoid making statements which would appear to contradict accepted dogmas. Also, by publishing in esoteric journals and academic presses they can usually escape the attention of those guardians of orthodoxy who vigilantly peruse the more popular media for wanderings from the straight and narrow. If they would choose to confront the traditional paradigm or, as is more frequently the case, if they find themselves confronted by its proponents, they should not expect to persuade traditionalists of the validity of non-traditional thinking. Rather, they should heed the advice implicit in the observation attributed to Niels Bohr, that revolutions in science do not succeed by being more explanatory or more precise or more comprehensive, but by holding their own until the old professors die off and the new professors take their chairs.

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1 For a summary treatment of these sacramental theologies, look at chapter 5 in *The Sacraments*.

2 For a discussion of these developments, see *The Sacraments*, chapters 1 and 2.

3 These and other works are described more fully in "Sacraments in the 1980s: A Review of Books in Print," published in the Spring 1991 issue of *Horizons*. 