THE COLLEGE

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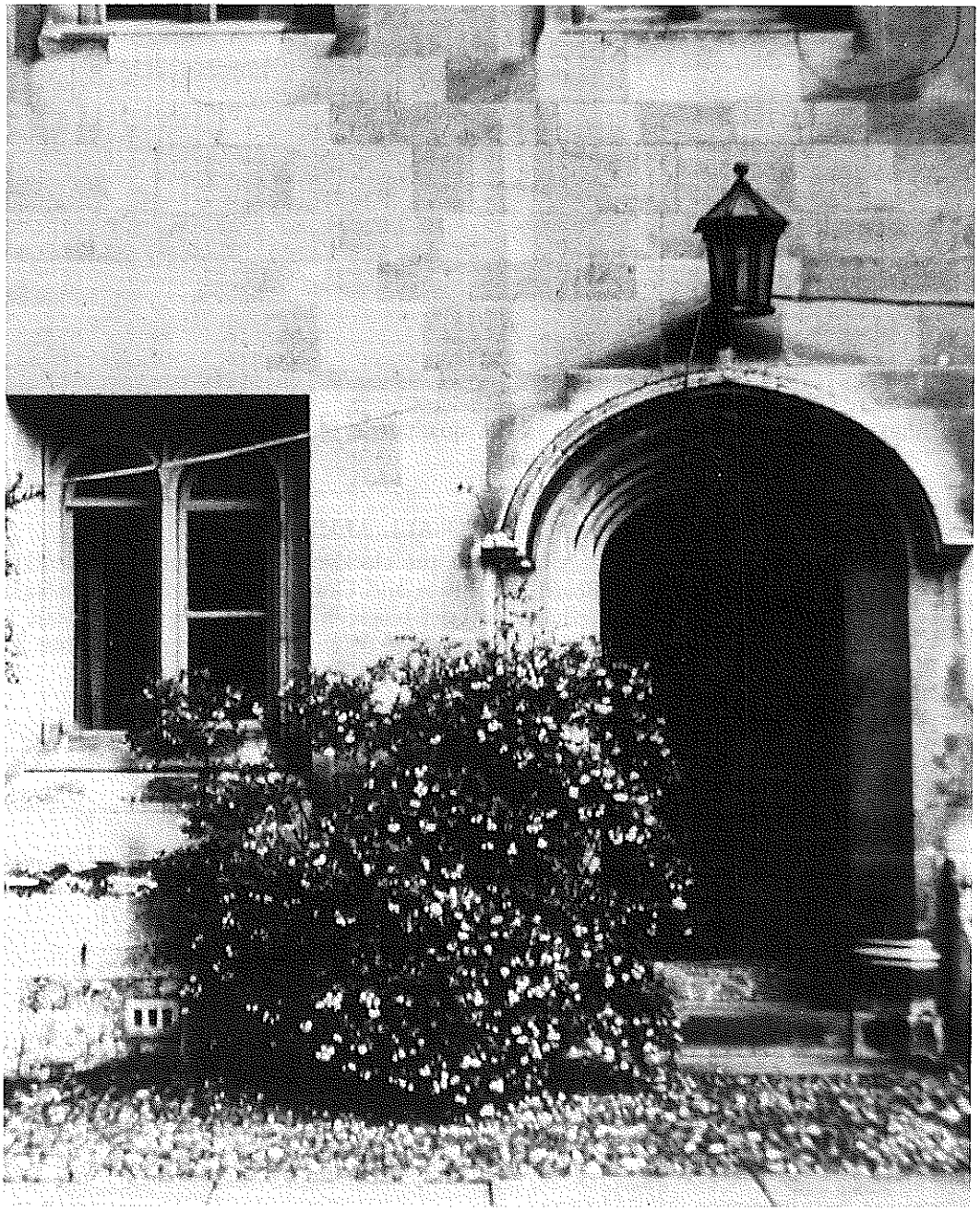

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ON THE COVER:
"Here," says Mr. Simpson (see lead article) "is Newton's front door. It would be tempting to say that this was the door to the modern world. But I think it was not. It was the door to a world that never was—a world Newton envisioned, in which mathematical physics would be the center of philosophy and theology, a vehicle of intellectual insight into purpose, design, and history."

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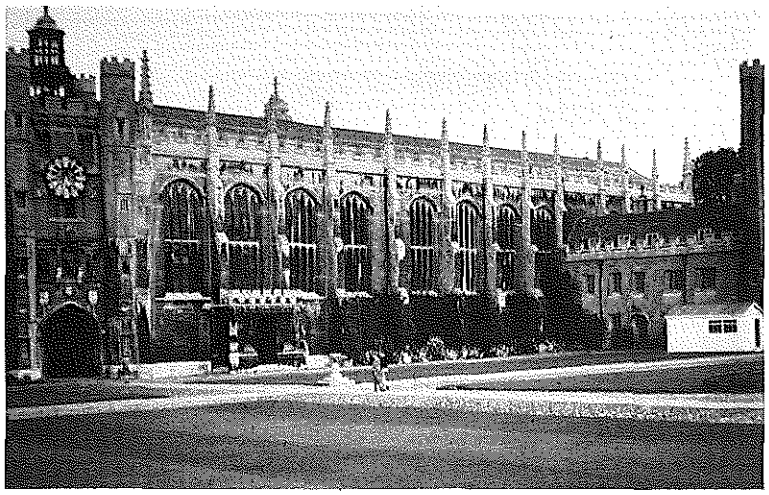


This is the quadrangle of Trinity College, Newton's college at Cambridge.

NOTICE TO ALL ALUMNI:

A ballot for the election of two alumni representatives to the Board of Visitors and Governors is on the inside back cover, together with brief biographies of the nominees. Please take advantage of the privilege of electing your representatives on the College's governing body. VOTE NOW.

T. P. Jr.

IN THE JANUARY ISSUE:

Newton
And the Liberal Arts

by Thomas K. Simpson

INTRODUCTION

I suspect that the fundamental political problem of our time is "*science*," with its counterpart, *technology*. What we call "science" is no longer an organic part of a single enterprise of human learning, but an autonomous process, of mind and practice, which yields results essentially outside the scope of human understanding. That it *works* in the laboratory constitutes its title to truth, but we are becoming, I think, acutely aware that we have let both science and technology work *upon* us, not *for* us, both intellectually and politically. We sense that we have no longer any way to make science part of a larger body of philosophy, nor technology part of a governed political order. The pervasive technology of our structures of production, distribution, and finance have made of our political Republic a mere shadow of a technological order over which we can hardly pretend to exert political control. This is tyranny at all levels—tyranny without a tyrant—and because it is so pervasive and so nearly invisible, masquerading in all the guises of progress and expertise, far more dangerous than the relatively apparent and limited outrages of George III. Therefore political responsibility requires that we reexamine the foundations of our understanding of this thing in our midst we call "science," and search more keenly for the real outlines of technology, and its relations to our apparent polity. But this kind of critical search for foundations is exactly the work of the liberal arts as we understand them at St. John's. So in this sense, I hope that this lecture on "Newton and the Liberal Arts" might be regarded as a modest contribution to our college's participation in the national bicentennial reconsideration.

Before I turn to Newton, I would like to say a few words about the Class of 1950, which is celebrating its quarter-century reunion this weekend. This class has a special relation to the problem of science and technology of which I have been speaking. Most of the members of that class came, as freshmen, in 1946, directly from some aspect of an encounter with the Second World War. To perpetuate what may be a myth, I think the average age of that freshman class was computed by Miss Strange to be 26. The world was still ringing with the reverberations of Hiroshima and Nagasaki when we picked up Homer for the first time. It was clear that this nation, and the world, had entered upon an era in which science, technology, and the polity were to be wedded in a new way. I suspect that many of us came to the College in the hope that whatever the "liberal arts" proved to be, they might in some way show how this marriage of science and the polity could be blessed for the benefit of mankind. To speak personally, *I* at least arrived that fall directly from the horrors of a Washington war laboratory, turning from the practice of modern technology to the liberal arts in the hope that they could shed some light on the plight of the world polity. The first reading was the *Iliad*, and the lights have been confused and doubtful ever since.

In the quarter-century since this Class of 1950 graduated, things have moved acutely from bad to worse for the new technological Republic. Reflecting on this curious chronology of centuries and their fractions, I find it striking that our little time of 0.25 century bears such a considerable ratio to the age of the Republic itself, which at

This lecture, given at the Annapolis Homecoming on October 24, 1975, is part of a larger report on science and the liberal arts which Mr. Simpson is preparing as a member of the Committee on the Liberal Arts, a group at present consisting of five tutors on the Santa Fe campus meeting to re-open discussion of the foundations of the St. John's program. This work is funded through the generosity of the National Endowment for the Humanities.

its bicentennial mark is only eight times as old as this class. Incidentally, St. John's, in its manifestation as a college, is about as old as the new Republic, which it was chartered to serve: though the numbers are not right, it is a little as though our class were the second-hand of a master-clock, whose minute-hand kept the time, at once of the Republic and of our College.

The hour-hand behind these two brief chronologies I suggest measures the development of modern science, which we might date from Euclid or Ptolemy; but a great mark on this long, slow dial was the publication of Newton's *Principia*. I have tried to establish what Newton was doing just three hundred years ago, in order that we might have a tricentennial of modern science to go with the bicentennial of the Republic and the quarter-century of this class, but all I have found is that this seems to be the tricentennial of the occasion on which some of Isaac Newton's friends got together to pay his back dues to the Royal Society, so that he could continue to deliver his papers on natural philosophy. Perhaps that is an occasion sufficiently full of consequences for the modern world to be worth commemorating, so that we have tonight the quarter-century reunion of the St. John's Class of 1950, the threshold of the bicentennial of our Republic, and the tricentennial of the payment of Isaac Newton's back dues to the Royal Society by his friends.

They are, I suggest, all related. For our Republic was designed in the image of Isaac Newton's vision of the System of the World, set forth in the Third Book of his *Principia*. Hobbes had taught man to regard the state as an artifice to rescue himself from war and his own nature, but it was Newton who showed how exactly-counterworking forces could be composed to form a harmonious and lasting system—and this composition of forces in the system of the planets about the sun was the ultimate paradigm for the authors of our Constitution as they attempted to solve the three-body problem of the legislative, the executive, and the judicial powers.

Newton, then, showed how the cosmos might be grasped by the mind as a purposeful system, an intelligent design; the authors of our Constitution showed the world in turn how man could make this insight, out of mathematical physics, serve him in the design of a balanced and rational polity; and now we are seeing, in this short period since the Second World War, how the specter of science and technology, having escaped from human comprehension or control in a terrible autonomy, threatens our designs and our world with destruction.

It seems to me, then, that the clock of modern science is the critical measure of our Republic. And I propose tonight to refer back to Newton's *Principia*, the founding document—in a sense, the Constitution—of modern science, in order to attempt to recover something of Newton's sense of mathematical physics, not as an autonomous endeavor, but as an instrument of philosophy and a means by which man might better understand himself and achieve his true purpose. Fundamentally, I think this comes to a question of Newton's understanding of his enterprise in relation to the tradition of the liberal arts.

DISCUSSION OF NEWTON'S "PREFACE TO THE READER"

On the whole, Newton writes with a certain grammatical and rhetorical precision which rewards careful reading. We might note that his standards, or rules, for his own writing may be understood as the inverse of the rules (*regulae*) he formulates for the interpretation of a text: everywhere the arts of the Trivium have these two faces—as arts of *composition*, of the making of discourse, they are guides to speaking or writing; as arts of *interpretation*, they are guides to listening or reading. For Plato and Aristotle, they were primarily arts of making; with St. Augustine and the Christian rhetoricians, a transformation takes place by which—in the face of a sacred text—the art of interpretation necessarily takes first place, and becomes greatly and subtly elaborated. Newton—in this Christian tradition—is faced first of all with problems of interpretation. For him, human learning is a question of the interpretation of two great texts: sacred scripture,* and the phenomena of the physical world. Reading of the first takes us to moral law and theological truth; reading of the second takes us to the laws of nature, and constitutes philosophy . . . but the two reflect deeply on each other. Newton wrote a considerable number of works which were left unfinished or unpublished. At the be-

*Those who remember David Castillejo as a tutor on the Annapolis campus during the years 1962-1963 will be interested to know that it is he who, in the course of extensive work on Isaac Newton, inventoried the great quantity of Newton's theological manuscripts in the Jewish National and University Library in Jerusalem. A recent book, *The Religion of Isaac Newton* by Frank E. Manuel (Oxford, 1974), is to a large extent based on these materials.

ginning of one of them, on the interpretation of prophecy, he set out what he called "rules of interpretation," *regulae interpretandi;* and at the outset of the Third Book of the *Principia,* the System of the World, he set out another set of rules, the "rules of reasoning in philosophy," *regulae philosophandi.* But the two sets of rules run parallel to one another, and it is clear that they are both, finally, rules of interpretation—rules for finding the meaning of texts. And these rules of interpretation interweave closely with rules of composition; the *Principia* is at once a careful and exact *composition* on Newton's part, and the outcome of a new *interpretation* of nature: it is a *composition* which formulates a new method of *interpretation,* and hence, a new instrument of philosophy. It is in this sense Newton's intention to make a dramatic contribution to the liberal arts. He designs the *Principia* to achieve a turning-point, a crisis, in the liberal arts, and in its propositions the arts of the past and the arts of the future are suspended in extreme tension.

In the "Preface to the Reader" which he wrote for the First Edition of the *Principia,* Newton gave a very tight account of this revolution in the liberal arts which he intends to launch upon the world. The first sentence already carefully, if very schematically, locates the *Principia* in the history of natural philosophy. He first characterizes the *ancient* investigation of nature as culminating in a certain understanding of "mechanics"—he means most of all the mathematics of Archimedes. He then alludes in a phrase to a long *middle period* in which the Trivium displaced the Quadrivium—mathematics was set aside and other terms of analysis were substituted, "substantial forms" and "occult qualities," he says. The third, *modern* period, he sees as a restoration—literally, a recalling—of natural philosophy to mathematics, in the new guise of what he calls mathematical *laws.* This history—the whole intellectual history of western man in relation to the study of nature—has been set out in an initial dependent clause: it is the *whereas* clause of Newton's own Proclamation. Let us try translating it that way:

> WHEREAS the ancients most of all prized mechanics in the investigation of nature . . . and those of more recent times, having discarded substantial forms and occult qualities, have undertaken to recall the phenomena of nature to mathematical laws,
>
> IT IS PROPOSED in this treatise to cultivate *mathesis* insofar as it looks to philosophy.

This is the very form of a declaration, a new Constitution. Others, Newton says, have gone far: but they have failed to achieve the union of *mathesis and philosophy,* and it is this which the new *Principia*—namely, the *Mathematical Principles of Natural Philosophy, Philosophiae Naturalis Principia Mathematica*—will teach mankind to do. The first word in the Latin title is philosophy.

Newton uses the Greek term *mathesis* in his declaration, to suggest the scope of the enterprise: he means demonstrative argument in a new sense, and in a new application. Though he embraces Euclid and Archimedes as teachers, we shall see that he boldly extends the bounds of their geometry to become something he will call *universal mechanics;* and though his argument in the *Principia* will be demonstrative, his intention is to transform it from a mode of formulating what is known into an instrument of inquiry, and by its use to transform the nature both of mathematics and of philosophical investigation—in effect, to make an extended geometry the instrument of dialectic.

The "opening question" of the *Principia,* then, is this puzzle: "How can *mathesis* bear upon (or 'look to') philosophy?" In contemporary terms, we might tentatively put it this way: "How can philosophy find its principles in, or through, mathematical physics?" In the terms of my opening remarks, perhaps: "How can man gain control over the autonomous mathematical sciences: how can they be brought into the circle of philosophy—of understanding and purpose?" We have failed to learn how mathematics can *look to* philosophy.

Having given this epitome of the problem he has set for himself and the world, Newton now takes some time to consider what the extended *mathesis* of the *Principia* will be. To achieve it, Newton must first bring about a revolution within mathematics itself. Thinking in terms of the traditional liberal arts, we might say that Newton, in order to bring the quadrivium into effective relation with the trivium—to get *mathesis* to serve philosophy—must first perform a revolution within the quadrivium itself. The crucial term at this point is "mechanics." The ancients, even when they brought the full power of their mathematics to bear upon mechanics, thought of mechanics under the paradigm which Homer gave them and

us when he called Odysseus *polymechanos*: a man of many "devices." Mechanics, Newton says, was for the ancients the realm of *human* contrivances, and hence, in terms of powers, a realm of *human* forces. When Archimedes, as the ultimate mathematical Odysseus, proposes to use the lever to move the world, the lever is a *machine* —one of the five classic "machines" (the lever, the screw, the inclined plane, the wheel, the pulley)—but the force upon it is always the hand of *man*. For Newton, this is both a fundamental insight, and a limited one—fundamental in that it shows how forces may work, limited in that the forces are supposed those of *man*. He distinguishes his own view dialectically in this way:

> This part of mechanics was cultivated by the ancients, with an eye to *manual* arts, in terms of the five powers, and they considered gravity—since it is not a manual power—hardly otherwise than in respect to moving heavy bodies by those powers.
>
> We, however—consulting not arts but philosophy, and hence writing not of manual but *natural* powers—treat most of all of those which look to gravity, levity, elastic force, the resistance of fluids, and forces of this kind . . .

Mechanics, then, had been seen as belonging to human arts and the realm of human *praxis*, the lower realms of Plato's divided line. Newton proposes to transform it to much higher philosophical status, by recognizing in nature—that is, in a truth which is not of man's contriving —"forces" or powers which we can understand by a sweeping analogy to those human arts and powers of Odysseus and Archimedes. For Newton, nature imitates art, in the sense that we move from the classical mechanics of human machines to a new, philosophical mechanics of natural powers, in which nature is the artificer.

We see, then, the promise of a philosophical mechanics. To relate this to the classical quadrivium of arithmetic, geometry, music, and astronomy, however, we must back up to look at a section of Newton's Preface which I have thus far skipped over. Newton makes the following claim:

> Geometry is founded therefore in mechanical *praxis*, and it is nothing other than that part of *universal mechanics* which exactly proposes and demonstrates the *art of measuring*.

Here Newton is entering into discussion with Euclid, and arguing that what Euclid takes for granted—demands, or "postulates," that is, asks the beginner in his art to *grant*—in fact derives from another science: namely, the description, the scribing-out, of the circle and the straight line. For Newton, this small distinction is not a quibble, but a fundamental clue. These two operations upon which geometry must be built he calls *praxis*, again perhaps going back to the Greek term in order to open the concept anew. *Praxis*, from the verb *prattein*, to do, means a *making* or *doing*, but this geometrical scribing is not the kind of "doing" which belongs to the artificers at the bottom section of the divided line. It must be a making which is higher in the intellectual hierarchy than geometry itself—that is, it must be as clear to the mind as the propositions of Euclid and prior in understanding: for if it were not, geometry would be founded on an obscure insight. Newton is thus proposing that there is a *praxis* which is a higher *mathesis*, and that by confusing this with ordinary mechanics, the ancients overlooked the fundamental possibility of a true mathematics of motion. He says:

> However, the errors are not of the art, but of the artisan. Whoever works less accurately, is a less perfect mechanic, and if anyone were able to work most accurately, he would be the most perfect mechanic of all (*mechanicus omnium perfectissimus*).

Therefore, mechanics should be cleared of this confusion, and we should now recognize, above geometry in the hierarchy of arts, a new member of the erstwhile quadrivium: *universal mechanics*. Within this new structuring of the quadrivium, motion is primary; the mechanics of powers or forces is one branch, while pure geometry, devoid of the concept of force, is another. Thus Newton says that what is commonly called "geometry" is in fact just *that part* of *universal mechanics* which deals with the art of measuring. We might say that universal mechanics is the "real geometry," of which Euclid's is one, limited, aspect. The other part Newton goes on to term

rational mechanics—perhaps we should translate this phrase as "intellectual mechanics" to make clear that it is a mechanics which is altogether an object of the mind —and this is the part concerning powers, or forces, which Newton takes from Archimedes and which we discussed first: Newton defines his *rational mechanics* in this way:

> In which sense rational mechanics will be the science of motions which result from any forces whatever, and of the forces which are required for any motion whatever, exactly enunciated and demonstrated.

Here, in this brief definition, we see the link forged between the new *mathesis* and philosophy. Essentially, I believe Newton agrees with Aristotle in his understanding of natural philosophy: the object of natural philosophy is *motion*—those motions which occur in the natural world, regularly and without man's assistance—and the object of the natural philosopher is to assign the true causes of those motions. The primary difficulty is to grasp the concept of motion; the next is to come to an agreement about "cause." Aristotle defines motion in terms of a dual mode of predication: to *be* potentially, and to *be* actually. Aristotle thus grasps motion through a grammatical distinction, through the instrumentality of the Trivium. Newton, by contrast, proposes that motion is rightly grasped as a primary mathematical object, and hence claims it for the Quadrivium. Aristotle distinguishes four aspects of the question of cause: the *in which*, the *by which*, the *what*, and the *for-the-sake-of-which* . . . again, making crucial use of grammatical structures. And again, Newton shifts that question from the workshop of the Trivium to the realm of *mathesis*, by locating the question of cause in that one concept, Latin *vis*, power or force, and claiming that the relation of motion to its cause—that is, motion to force—is a problem for exact enunciation and demonstration.

Perhaps we should pause to make clearer the relation between this outline of purpose in the Preface, and the actual structure of the *Principia*. The *Principia* is organized in three books. The first two contain the body of basic propositions which constitute what Newton calls the "mathematical principles of natural philosophy"—strictly, these two books are the "*Principia*," the *principles*. The third book is appended to the work as an illustration: where the first books, as the books of the new *mathesis*, look to their application in philosophy, the third book is an example of that new philosophy itself. The first two books are books of mathematics; the Third book is a book of philosophy. As such, this third book is the first sample, the first step toward what is ultimately, I think, intended by Newton to be the real replacement for Aristotle's *Physics* in its full range. This "sample" deals with only one of those natural forces Newton has alluded to, namely gravity, and thus deals with the world only in its aspect as a *gravitational* system. It conspicuously does not, for example, deal with the optical system of the world, nor with those other alchemical or chemical forces which are in his program the causes of the vital motions of nature. We should observe right away that *physics* no more denotes to Newton than it does to Aristotle that "inorganic" realm which we now call physics, and distinguish from biology and physiology. When I spoke, as I did earlier, of Newton's work as "mathematical physics," I was technically correct but misleading. Newton clearly intends a mathematics of all natural things, including especially those which live and grow. Rational mechanics is the mathematics of φύσις. The *Principia* sets forth the *mathesis* of all nature; the gravitational system unfolded in the Third Book is a brilliant, but relatively easy, first step in the new philosophy, an exemplar by which Newton intends to endow the world with its new illumination, its new universal method in philosophy.

We have seen then that Newton proposes to bring the investigation of *physics* into intimate relation with a transformed version of the arts of mathematics. We have seen the aim, but not a method by which it might be brought about . . . and here it is that Newton learns fundamentally from Descartes. Already we see it in the symmetry of his definition of rational mechanics, which we have quoted:

> . . . the science of the motions which *result from* any forces . . .
> and of the forces which are *required for* any motion . . .

If forces are causes, we see that the science of mechanics will proceed by two great modes of argument: *from* forces *to* motions, i.e., from causes to effects; and from *motions* to *forces*, i.e., from effects to causes. *Both* are to be conducted by means of mathematical demonstration. Newton

now goes on to formulate this plan in a larger way:

> Every difficulty of philosophy is seen to turn upon this: as from the phenomena of motion we investigate the forces of nature, so thereafter from these forces we demonstrate the remaining phenomena.

When we see that the *motions* are the *phenomena* with which nature presents us, and that the passage from the motions to the forces is the intellectual progress from the *effects* to their causes, we recognize that Newton is referring here to that progression from phenomenon to cause which Aristotle calls *analysis*—that is, the direction of inquiry in physics. The reversed process, the passage from the causes, now known, to their consequences, is the *direct* motion of philosophical argument, the building of a system of consequences from a few first principles which are themselves best known, and this is *synthesis*. What Newton is proposing is that these two motions in philosophy—the order of inquiry, and the order of knowing—can both be carried out by demonstration, in the new *mathesis*.

Now analysis and synthesis, which Aristotle in the Organon sets forth as the two phases of the work of the philosopher, have always been known to have their counterparts in mathematics. To begin with a few things well known, and to demonstrate their consequences at great length, is exactly what Euclid does, and hence we call his book of Elements a work of *synthesis*. The construction of the five regular solids will always stand as the clearest model of the mind's building in direct, synthetic argument.

On the other hand, there are some occasions when the ancient geometers proceed the other way: they start with the unknown and reason toward the known. How can that be done? The formula is, in effect, "Assume the thing done"—that is, take the unknown *as known*. In the case, for example, of a geometrical construction which is sought, suppose the figure to have been constructed; then, on this assumption, reason to those necessary consequences which *would* follow—reason in the subjunctive mode—until you come to a consequence which you know in fact is true. From this *terra firma*, if the steps of the argument can all be reversed, the analysis can be turned into a synthesis by going through the argument backwards until the unknown is arrived at, but this time as a necessary consequence of what is known to be true.

All this is familiar from the ancients, though they use analysis very seldom, and on the whole, the classic geometers leave no trace of their *method of inquiry*—that is, any method by which they discovered their propositions. Descartes proposed to recover that ancient art of discovery, but in a new and more powerful form, which he revealed as a refinement of algebra: a universal art of reasoning from the unknown to the known. His *Discourse on Method* sets forth the new universal analysis in the guise of the method of "doubt." In its application to geometry he calls it *analytic geometry*.

Now the idea of a systematic mathematical analysis, by which to move by precise argument from the unknown to the known, is the very methodological backbone of Newton's *Principia*. In this, Newton is deeply a disciple of Descartes. But what Newton gives us is not an algebraic analysis, but a *geometric analysis*, and this represents a major and deliberate turning away from Descartes. Newton is a master of algebra, and uses it whenever he must; he was responsible for major developments in the theory of equations and the use of infinite series. He knows well that algebra opens vast new powers in mathematics. But he knows too that those symbols, letters representing the unknown, or representing nothing, reduce science to an obscurity, and move by way of automatic processes which bring no light to the mind. Therefore there is a minimum of algebra in the *Principia*, and a maximum of appeal to the eye of the mind through the artful use of the imagination. This battle of the arts—from Newton's point of view, the battle against the new, illiberal arts of algebra, and his effort to reinstate the geometry of the ancients, but now as a vehicle of powerful and precise analysis as well as synthesis—is at the very center of Newton's purposes.

Newton agrees with Descartes that the world is a mathematical object, to be solved by the methods of mathematical analysis. To this extent, both concur that philosophy is to be transformed by adopting mathematical analysis as the method of inquiry. But for Descartes, this means that nature is a simple object. "Matter is *extension*," he says. Essentially I think Descartes means by the term "extension" *that magnitude (megethos)* which is the object of Book V of Euclid's *Elements*. And that extension-in-motion constitutes all there is in the natural world.

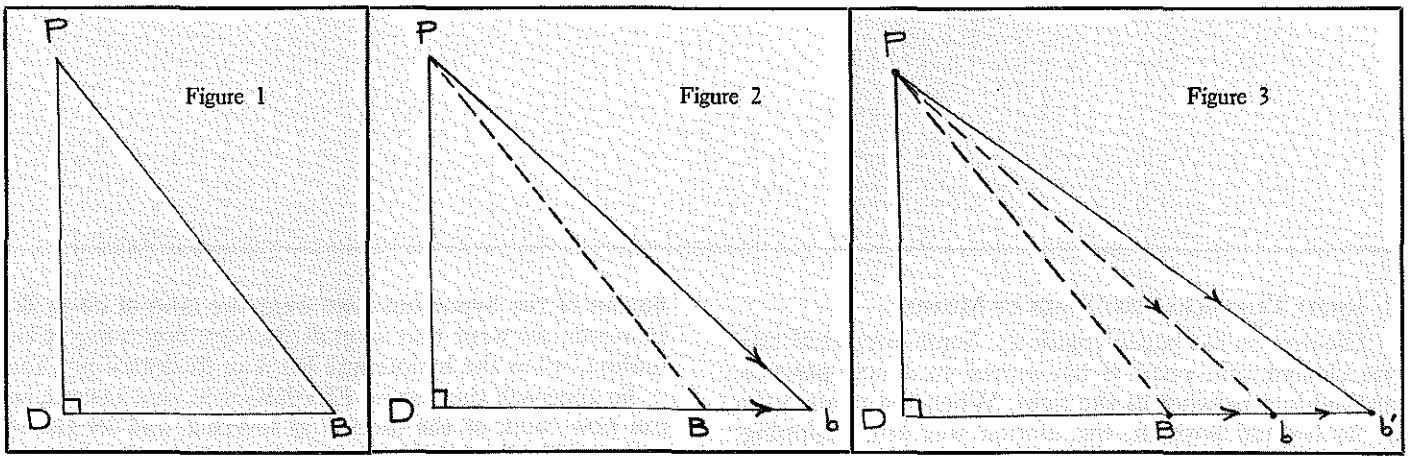


Figure 1 Figure 2 Figure 3

Hence in determining those configurations and changes of motion which constitute all the real events of nature, algebraic symbols are wholly adequate and appropriate. For Descartes, there are no powers and no agents in nature, *no causes*, beyond the interchange of motion from configuration to configuration. The world, for Descartes, is a plenum of this extension-in-motion, and hence is strictly a *machine*. The right image for the mechanical philosophy in this strict sense is a clockwork, motion engaging motion with no gaps.

For Newton, such a vision of a mechanical philosophy is anathema. Indeed, a major part of the *Principia* is devoted to insistent dialectical refutation of the *mechanical* philosophy of Descartes and of the corresponding mechanical theory of light of Huygens. Instead, for Newton, nature is a true object of *nous*, full of intelligible causes and evidences of purpose and plan, which it is of the highest importance to comprehend. This is the philosophic vision which Newton's geometrical and mechanical analysis is shaped to make possible by showing the mind the way to true causes, both material and spiritual. Ultimately, the real model for that mathematical analysis which Newton has in mind is the Christian rhetoric of interpretation taught by such masters as Augustine, by which the creation is to be read as our evidence of the presence and work of the Creator. Any such reading, which entails a transforming passage from flesh to spirit, requires art and sensitivity, and does not proceed by smooth stages, but by a series of crises in the construction and interpretation of signs. It is Newton's discovery that even such a spiritual interpretation of the creation must be carried out by mathematical analysis, but by such an analysis as will point the way to design and true cause. The mathematical principles of the *Principia*, the new *mathesis* compounded of motion, force, and geometry, are carefully shaped to just that end—the diagrams are intelligible signs, contrived to point to realities and true causes which lie behind the appearances: an analytic *mathesis*—a mathematical rhetoric—then, to solve philosophical problems. The cosmos is a mathematical problem whose solution is, ultimately, God.

This is the analysis which the Third Book of the *Principia* illustrates in its *revelation* of the operation of universal gravitation throughout the frame of nature: every body in the cosmos attracts every other body by a force of a single genus called "gravity," ruled by an exact but purposeful mathematical law. Without high art and special method, the intellect unaided could never have uncovered such a mystery. It is a dramatic peripety, a breakthrough, in man's understanding of the divine plan: and as a first step in a new era of natural philosophy, a sure sign for Newton that time is running out and man is drawing closer to his God. It has, as Newton's account of the System of the World unfolds, many corollaries concerning history and God's plan for the world.

COMMENTS ON THE ILLUSTRATIONS*

1. Right Triangle

These illustrations will be relatively simple; I hope they will help to make clearer, however, how Newton transforms geometry into his new *mathesis*, and how he intends this new mathematics to become a true philosophical instrument. Figure 1 is of an ordinary Newtonian right triangle. Because it is a *Newtonian* triangle, however, it differs in a fundamental way from a Euclidean triangle: it exists in *mathematical time and space*. There is no "space" in Euclid: each of Euclid's figures simply exists, and enjoys whatever relations it may have to other figures in the same construction. But for Newton, the priority of mechanics over geometry entails the priority of what he calls "absolute" time and space. Even as it sits here, this triangle has what Newton calls "duration," and it will be meaningful, for example, to let the base DB begin to grow in length by setting point B in motion with uniform velocity toward the right.

* At this point in the lecture Mr. Simpson made use of a series of illustrative slides; eleven are reproduced here.

2. Right Triangle: First Stage of Motion

The motion has begun (figure 2). Some interval of time has elapsed, and point B has moved to a new position, marked b, somewhat to the right. When the point b was at its original position, the motion was just beginning: Newton says that it was NASCENT, i.e., "just being born"—Newton uses the Latin verb which gives us the word *nature*. As a consequence of the uniform growth of the base DB, the hypotenuse is of course growing as well. Newton calls both DB and PB FLUENT quantities. The characteristic question for this new geometry—Euclid's Elements set in motion—is, "What is the *rate of growth* of PB?" If DB grows at a uniform rate, its length *represents* or *measures time*—it is a clock—and the rate of growth of PB can be measured by comparing an increment of PB to a corresponding increment of DB.

3. Right Triangle: Second Stage of Motion

Figure 3 simply shows the motion still further advanced. You can see now that the rate of growth of the hypotenuse will not be constant, but PB will be growing faster as DB lengthens. Therefore to be exact, we must specify its rate of growth *at* some particular moment. Just to give you an idea of the kind of theorem Newton enunciates in this new sequel to Euclid, this particular diagram illustrates the proposition that "the *rate of growth* of the hypotenuse PB at any position of B, is given by the *ratio of DB to PB*."

Newton terms this rate of growth at a definite moment the FLUXION of the quantity in question, and calls his new geometry of motion the science of FLUXIONS. This theorem thus determines the FLUXION of the hypotenuse. Of course, we have not proved the theorem.

4. Right Triangle: Construction To Determine The Fluxion

Without actually undertaking to give a proper proof of Newton's theorem, I would like to suggest how he approaches the evaluation of a fluxion. The crucial problem is to compare the increments of two quantities with one another. In this case, we want to compare the increments of the hypotenuse PB and the base DB (figure 4). The little shaded triangle drawn in the lower-right-hand corner of this diagram relates those two increments. In the shaded triangle, cb is the increment of the hypotenuse; Bb is the increment of the base. Therefore, to get the fluxion of the hypotenuse, we want the ratio of cb to Bb. However, we want that ratio at the very beginning of the motion, when the hypotenuse PB is in its dotted position.

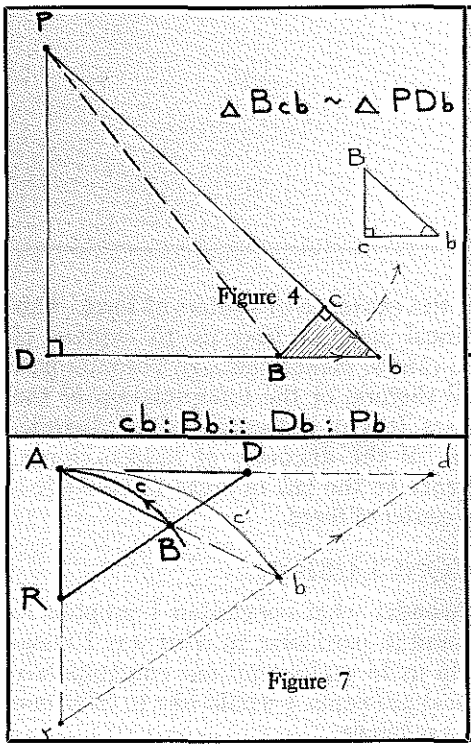
To approach the precise FLUXION at that instant, we can now think of the motion as reversed, and let the increment Bb shrink back to zero; this will be what Newton calls the EVANESCENT motion, the motion of vanishing, the mirror image of the NASCENT motion. The required FLUXION will be the ratio of the two quantities cb and Bb to one another just as they are vanishing—their ratio as they disappear.

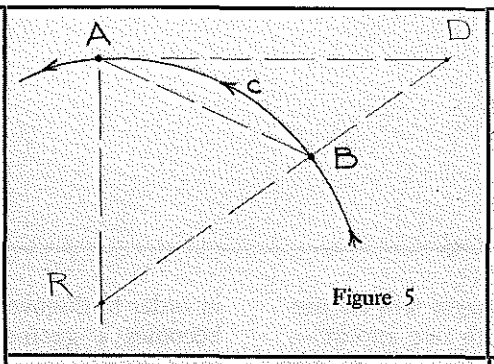
Newton's method of following the behavior of these two disappearing magnitudes is, I think, characteristic of the rhetoric of his arguments. For he finds a way to keep these quantities visible to the eye, and *to the eye of the mind*, even as they vanish. He shows that the little shaded triangle is similar to the whole triangle PDb —I have redrawn the little triangle right-side-up off to the side so that you can see that similarity. Then as Bb and the little triangle utterly vanish, the large triangle PDb will always make the shape of the *vanishing triangle* manifest to us. And finally, at the point of vanishing, the shape of the *disappearing* triangle is seen to be nothing but the very shape of the *original* triangle PDB. And the FLUXION, namely the ultimate ratio of cb:Bb with which those quantities vanish, is the same as the ratio of the base to the hypotenuse of the original triangle. And that is the theorem.

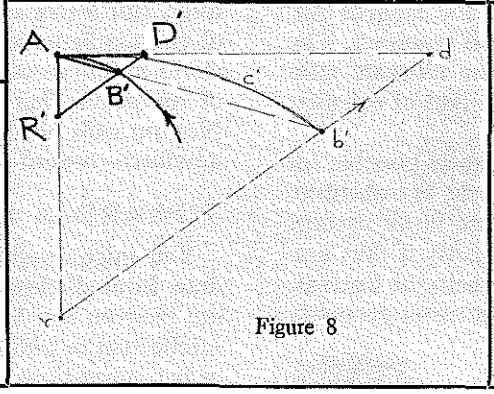
Here, then, is the foundation of an entire new geometry of moving, growing, and shrinking figures. It is, for the first time, a geometry truly adequate to deal with nature, the realm of motions. The new status given to an idea of mathematical time has of course implications beyond geometry. All existence will now be *in time*, and will have *duration*. Events will be *in history*, each at a moment of time placed somewhere between the creation and the end of the world.

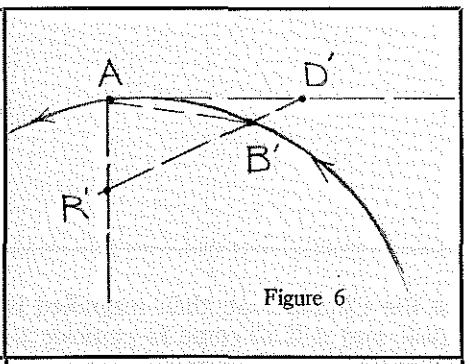
5. Fluxion Of A Curvilinear Segment (Lemma VII)

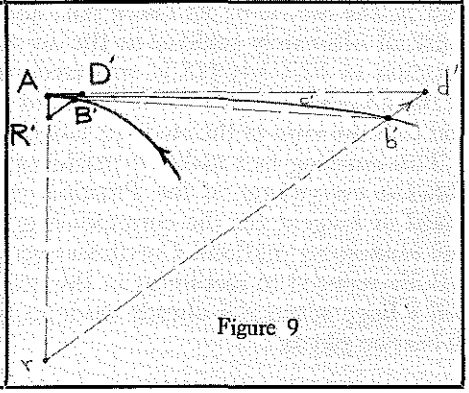
Most of the natural processes in which Newton will be interested involve motions in curved lines. In figure 5 point B is moving along the arc BCA toward A. What can the science of FLUXIONS say about *it*? To establish a ratio which will be of value in the study of motion along curves, Newton draws the chord of that arc, AB, and then asks the ratio of the length of the arc ACB to that of its











chord AB.

6. Curvilinear Segment (2)

To get a further ratio, another measure of the same motion, Newton now draws the line RD in any arbitrary direction, so that it cuts off a definite length along the *tangent* drawn to the arc at A. And he asks the ratio of the arc length ACB to the length of this tangent, AD. We now have to watch these ratios as B moves toward A.

7. Curvilinear Segment (3)

As B moves to B' (figure 6), and the arc shortens, the line R'D' is always drawn parallel to its original position, so that a definite rule is established for cutting off the length along the tangent. We are now watching the EVANESCENT motion to get two FLUXIONS: the ratio of the arc to its chord, and the ratio of the arc to its tangent. The FLUXIONS in question will be ultimate ratios as B' actually reaches A, and all the quantities we are comparing vanish. Again, Newton will use a rhetorical device to make those vanishing ratios visible to us.

8. Curvilinear Segment (4)—Microscope, First Position

Returning to the first position of the arc, chord, and tangent (figure 7), Newton now sets up his microscope—an enlarged figure, drawn here in light lines, which is *similar* to the one in which we are interested, that is, the heavy and the light figures have exactly the same *shape*. Here the ratio of the base of the light figure to that of the heavy figure is just 2:1, as if the figure had been enlarged in a photographic enlarger—or by means of a slide projector.

9. Curvilinear Segment (5)—Microscope, Second Position

In figure 8, B has now once again moved toward A, to its new position B'. We increase the power of the enlarger, so that the light figure preserves a constant size; the base seems to have been enlarged in the ratio about 4:1. The arc Ac'b' is again of exactly the same *shape* as the original AB'. And the ratios of arc to tangent, and of arc to chord, are exactly the same in both the heavy figure and the light one. This will be true however small the heavy figure becomes—we will simply enlarge it with greater magnification, to keep its light image at constant size.

10. Curvilinear Segment (6)—Microscope, Third Position

Arc AB' is now very small—approaching zero: it is vanishing, EVANESCENT (figure 9). Still the shapes and relative sizes of arc, chord, and tangent are precisely exhibited to the eye in their enlarged counterparts, the power of the rhetorical microscope having been increased to keep the original *size* of the light figure, though with the new *shape* of the heavy one. Since there is no limit to the available power of this mathematical microscope, you can clearly see the theorem Newton is here demonstrating: as the arc AB, its chord and its tangent vanish

like the Cheshire cat, their magnified images will be preserved, and *will all come to coincide with one another*—that is, the arc Ac'b', its chord Ab', and the tangent Ad' must all ultimately coalesce as the arc AB' vanishes. The question of FLUXIONS is answered: the ultimate ratio of the EVANESCENT arc to its chord is that of equality, and so is the ratio of the arc to its tangent.

This amazing fact makes it mathematically possible for Newton everywhere in the *Principia* freely to substitute chord or tangent for the corresponding arc in all nascent and evanescent motions. Curvilinear geometry is thus universally reduced to rectilinear in the geometry of fluxions, and a huge advance is already made in bringing geometry to bear on *physis*.

11. The Law Of Areas (1)

The propositions which we have just looked at are instances of the Newtonian geometry, but not of the new rational mechanics. Here is an illustration from the new *mathesis*, a first step in a mechanics which analyzes phenomena to find their causes. Proposition I of the *Principia* demonstrates that whenever a body is drawn by a force which is always directed to a fixed point, it will move in such a way that its radius sweeps out equal areas in equal times. In figure 10, a body is shown moving on an elliptical path, but always drawn by a force directed to the point S. The body moves in equal increments of time from position A to 1 to 2 to 3 to 4. The proposition says that the shaded area swept out by the radius from S to the body grows by equal increments in those equal times. (If the body is our Earth, and S the Sun, then the diagram shows the positions of Earth for four successive months.)

12. The Law Of Areas (2)

Figure 11 shows the same motion in another way—we see here the motion for two equal periods of time, the second month and the fourth month. According to Proposition I, the two shaded areas are equal.

Now, how does this proposition become an analytic instrument, a means of penetrating the phenomena to discover causes? First, its converse is proved, in Newton's Proposition II: that is, *if* a body sweeps out equal areas in equal times about some point, *then* a force acts on it always toward that center. We have only to search the phenomena of nature for evidence of this relationship, in order to discover the existence of centers of force. This becomes a geometrical *sign* to lead us to centers of force. But forces are causes. Hence this sign becomes part of the mathematical rhetoric of the interpretation of the world to find its causes. It is an instrument of the rhetoric, of *invention*, that is, of the *discovery* of hidden things. Newton calls obedience to the law of areas an INDEX—a pointer—toward a center of force.

TOWARD A CONCLUSION

You might well wonder what conclusion I propose to draw from all this—and in particular, in what way I imagine Newton can help us to understand our contemporary intellectual or *political* problems. I would like to offer one or two suggestions, very briefly.

I suspect the beginning of all our troubles with science and with technology—that is, with this syndrome of difficulties, intellectual and political—is the pretended autonomy of science: namely, the claim that it can arrive at truths, or valid judgments, apart from human truth in general: that mathematical science can or must be a *separate* realm of human inquiry. And I think this is one way to look at the dialectical issue Newton is drawing in the *Principia* between himself and Descartes. Newton intended a science which was mathematical and strictly disciplined, but *not autonomous*: essentially, he intended science to remain dialectical. It is just this pretension to autonomy which he denies in his refusal of algebra, and his refutation of mechanism. What he reveals in the *Principia*, instead, is a *geometrical* analysis appropriate to dialectical inquiry, and the vision of a world which is a *system*, in which mind and purpose are at home. For Newton, mathematical law is an evidence, not of binding necessity, but of intelligence and design.

Newton rejects what we call "pure science," and which he called "naked speculation." And I think he is right. "Pure" science is not knowledge. And ungoverned technology, its counterpart, is not a boon. One does not have to accept their theology in order to agree with Milton and Newton that there is some sense in which separation is Hell: the world Newton wrote the *Principia* to avoid is the very one we have landed in—and it is also the one Milton depicted in those splendors of the Satanic building in Hell. The beginning of a way out, if there is one, would be that path to which St. John's College is dedicated: the restoration of critical, free dialogue: dialogue

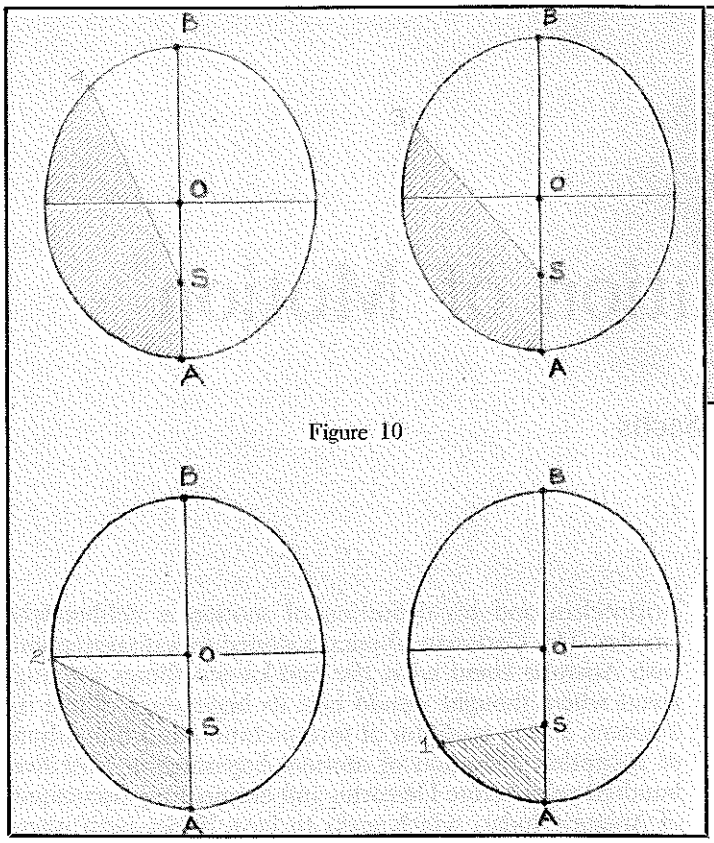


Figure 10

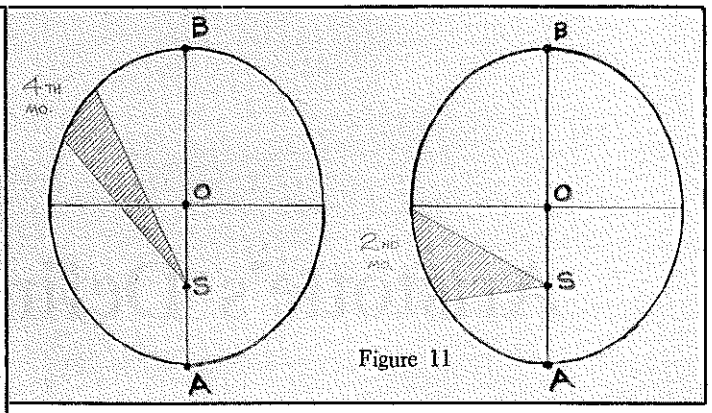


Figure 11

which goes to the very roots of our unilluminated assumptions about science and politics—two areas which I am convinced are for us deeply, perhaps tragically, related.

Our Republic can be preserved only by being understood—from the ground up, so to speak—in relation to the new forces which now press upon it. It falls to us to pick up the founding dialectic and to *work through it* again—for the task is ours, *now*—but with the new realities of science and technology in the very center of the discussion.

The new Republic will be—indeed, *inexorably already* is—a scientifically founded, technologically integrated society. We need all the wisdom and strength of the myths of our tradition, but we must not let them be corrupted into illusions. And the renewed founding discussion will have many new participants in it—many of whom have learned deeply from Newton, many of whom have followed him or defied him in constructing the edifice of modern science—I mean authors such as Kant and Hegel; Marx and Lenin; Maxwell, Einstein, Keynes, Schroedinger. All of these voices, and a great many more, must be part of the perpetual founding discussion of our Republic.

You might well feel that I am now merely uttering a familiar platitude—"the St. John's Program is the true founding discussion of our Republic." I do believe that is the case, but that it is really no platitude, and the fact that our discussion is *academic* in no way means that its outcome is *safe*. Here at St. John's, as in serious conversation among citizens everywhere, we are re-constituting our Republic, and to say that the conversation is "serious" is to recognize that it is an open question how the new constitution ought to read—whether indeed it can be a constitution for one "nation" alone, as though nations were politically factorable in a technologically united world.

In our Republic at this moment genuinely free discussion of these questions is systematically and actively—technologically—discouraged. So the work of St. John's and other liberal colleges, where the unity of the human enterprise is a working hypothesis—and a constant object of passionate search—is not to be taken for granted. Our work is philosophical, not political, but it is central to the political process.

And, I submit, the reading of Newton's *Principia* is, in every sense, *no small part* of that labor. I wish we could follow Newton to a new understanding of mathematics, by which mathematical physics could be humanized, live easily with philosophy, and ultimately be at home in a rationally governed human society.

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Aristotle's Definition of Motion

by Joe Sachs

Aristotle defines motion, by which he means change of any kind, as the actuality of a potentiality as such (or as movable, or as a potentiality—*Physics* 201a 10-11, 27-29, b4-5.) The definition is a conjunction of two terms which normally contradict each other, along with, in Greek, a qualifying clause which seems to make the contradiction inescapable. Yet St. Thomas Aquinas called it the only possible way to define motion by what is prior to and better known than motion. At the opposite extreme is the young Descartes, who in the first book he wrote announced that while everyone knows what motion is, no one understands Aristotle's definition of it. According to Descartes, "motion . . . is nothing more than the action by which any body passes from one place to another" (*Principles* II, 24). The use of the word "passes" makes this definition an obvious circle; Descartes might just as well have called motion the action by which a thing moves. But the important part of Descartes' definition is the words "nothing more than," by which he asserts that motion is susceptible of no definition which is not circular, as one might say "the color red is just the color red," to mean that the term is not reducible to some modification of a wave, or analyzable in any other way. There must be ultimate terms of discourse, or there would be no definitions, and indeed no thought. The point is not that one *cannot* construct a non-circular definition of such a term, one claimed to be properly irreducible, but that one *ought* not to do so. The true atoms of discourse are those things which can be explained only by means of things less known than themselves. If motion is such an ultimate term, then to define it by means of anything but synonyms is willfully to choose to dwell in a realm of darkness, at the sacrifice of the understanding which is naturally ours in the form of "good sense" or ordinary common sense.

Descartes' treatment of motion is explicitly anti-Aristotelian and his definition of motion is deliberately circular. The Cartesian physics is rooted in a disagreement with Aristotle about what the best-known things are, and about where thought should take its beginnings. There is, however, a long tradition of interpretation and translation of Aristotle's definition of motion, beginning at least five hundred years before Descartes and dominating discussions of Aristotle today, which seeks to have things both ways. An unusually clear instance of this attitude is found in the following sentence from a medieval Arabic commentary: "Motion is a first entelechy of that which is in potentiality, insofar as it is in potentiality, and if you prefer you may say that it is a transition from potentiality to actuality." You will recognize the first of these two statements presented as equivalent as a translation of Aristotle's definition, and the second as a circular definition of the same type as that of Descartes. Motion is an entelechy; motion is a transition. The strangeness of the word "entelechy" masks the contradiction between these two claims. We must achieve an understanding of Aristotle's word *entelecheia*, the heart of his definition of motion, in order to see that what it says cannot be said just as well by such a word as "transition."

The word *entelecheia* was invented by Aristotle, but never defined by him. It is at the heart not only of his definition of motion, but of all his thought. Its meaning is the most knowable in itself of all possible objects of the intellect. There is no starting point from which we can descend to put together the elements of its meaning. We can come to an understanding of *entelecheia* only by an ascent from what is intrinsically less knowable than it, indeed knowable only through it, but more known because more familiar to us. We have a number of resources by which to begin such an ascent, drawing upon the linguistic elements out of which Aristotle constructed the word, and upon the fact that he uses the word *energeia* as

a synonym, or all but a synonym, for *entelecheia*.

The root of *energeia* is ergon—deed, work, or act—from which comes the adjective *energon* used in ordinary speech to mean active, busy, or at work. *Energeia* is formed by the addition of a noun ending to the adjective *energon;* we might construct the word at-work-ness from Anglo-Saxon roots to translate *energeia* into English, or use the more euphonius periphrastic expression, being-at-work. If we are careful to remember how we got there, we could alternatively use Latin roots to make the word "actuality" to translate *energeia*. The problem with this alternative is that the word "actuality" already belongs to the English language, and has a life of its own which seems to be at variance with the simple sense of being active. By the actuality of a thing, we mean not its being-in-action but its being what it is. For example, I recently saw a picture of a fish with an effective means of camouflage: it looks like a rock, but it is *actually* a fish. I don't seem to be talking about any activity when I attribute an actuality to that thing, completely at rest at the bottom of the ocean. But according to Aristotle, to be something always means to be at work in a certain way. In the case of the fish at rest, its actuality is the activity of metabolism, the work by which it is constantly transforming material from its environment into parts of itself and losing material from itself into its environment, the activity by which the fish maintains itself as a fish and as just the fish it is, and which ceases only when the fish ceases to be. Any static state which has any determinate character can only exist as the outcome of a continuous expenditure of effort, maintaining the state as it is. Thus even the rock, at rest next to the fish, is in activity: to be a rock is to strain to be at the center of the universe, and thus to be in motion unless constrained otherwise, as the rock in our example is constrained by the large quantity of earth already gathered around the center of the universe. A rock at rest at the center is at work maintaining its place, against the counter-tendency of all the earth to displace it. The center of the universe is determined only by the common innate activity of rocks and other kinds of earth. Nothing is which is not somehow in action, maintaining itself either as the whole it is or as a part of some whole. A rock is inorganic only when regarded in isolation from the universe as a whole, which is an organized whole, just as blood considered by itself could not be called alive, yet is only blood insofar as it contributes to the maintenance of some organized body. No existing rock can fail to contribute to the hierarchical organization of the universe; I can therefore call any existing rock an *actual* rock.

Energeia, then, always means the being-at-work of some definite, specific something; the rock cannot undergo metabolism, and once the fish does no more than fall to earth and remain there it is no longer a fish. The material and organization of a thing determine a specific capacity or potentiality for activity, with respect to which the corresponding activity has the character of an end. Aristotle says "the act is an end and the being-at-work is the act, and since *energeia* is named from the *ergon* it also extends to the being-at-an-end (*entelecheia*)" (*Metaphysics*, 1050a, 21-23). The word *entelecheia* has a structure parallel to that of *energeia*. From the root word *telos*, meaning end, comes the adjective *enteles*, used in ordinary speech to mean complete, perfect, or full-grown. But while *energeia*, being-at-work, is made from the adjective meaning at work and a noun ending, *entelecheia* is made from the adjective meaning complete and the verb *exein*. Thus if we translate *entelecheia* as "completeness" or "perfection," the contribution the meaning of *exein* makes to the term is not evident. I would suggest that Aristotle uses *exein* for two reasons, which lead to the same conclusion: First, one of the common meanings of *exein* is "to be" in the sense of to remain, to stay, or to keep in some condition specified by a preceding adverb, as in the idioms *kalōs exei*, "things are going well," or *kakōs exei*, "things are going badly." It means "to be" in the sense of to continue to be. This is only one of several possible meanings of *exein*, but there is a second fact which makes it likely that it is the meaning which would strike the ear of a Greek-speaking person of Aristotle's time. There was then in ordinary use the word *endelecheia*, differing from Aristotle's word *entelecheia* only by a delta in place of the tau. *Endelecheia* means continuity or persistence. As one would expect, there was a good deal of confusion in ancient times between the invented and undefined term *entelecheia* and the familiar word *endelecheia*. The use of the pun for the serious philosophic purpose of saying

at once two things for whose union the language has no word was a frequent literary device of Aristotle's teacher Plato. In this striking instance, Aristotle seems to have imitated the playful style of his teacher in constructing the most important term in his technical vocabulary. The addition of *exein* to *enteles*, through the joint action of the meaning of the suffix and the sound of the whole, superimposes upon the sense of "completeness" that of continuity. *Entelecheia* means continuing in a state of completeness, or being at an end which is of such a nature that it is only possible to *be* there by means of the continual expenditure of the effort required to *stay* there. Just as *energeia* extends to *entelecheia* because it is the activity which makes a thing what it is, *entelecheia* extends to *energeia* because it is the end or perfection which has being only in, through, and during activity. For the remainder of this talk, I shall use the word "actuality" to translate both *energeia* and *entelecheia*, and by actuality I shall mean just that area of overlap between being-at-work and being-at-an-end which expresses what it means to be something determinate. The words *energeia* and *entelecheia* have very different meanings, but function as synonyms because the world is such that things have identities, belong to species, act for ends, and form material into enduring organized wholes. The word actuality as thus used is very close in meaning to the word life, with the exception that it is broader in meaning, carrying no necessary implication of mortality.

We embarked on this quest for the meaning of *entelecheia* in order to decide whether the phrase "transition to actuality" could ever properly render it. The answer is now obviously "no." An actuality is something ongoing, but only the ongoing activity of maintaining a state of completeness or perfection already reached; the transition into such a state always lacks and progressively approaches the perfected character which an actuality always has. A dog is not a puppy: the one is, among other things, capable of generating puppies and giving protection, while the other is incapable of generation and in need of protection. We might have trouble deciding exactly when the puppy has ceased to be a puppy and become a dog—at the age of one year, for example, it will probably be fully grown and capable of reproducing, but still awkward in its movements and puppyish in its attitudes—but in any respect in which it has become a dog it has ceased to be a puppy.

But our concern was to understand what motion is, and it is obviously the puppy which is in motion, since it is growing toward maturity, while the dog is not in motion in that respect, since its activity has ceased to produce change and become wholly directed toward self-maintenance. If the same thing cannot be in the same respect both an actuality and a transition to actuality, it is clearly the transition that motion is and the actuality that it isn't. Descartes is right and Aristotle is wrong. Of course it is possible that Aristotle *meant* what Descartes said, but simply used the wrong word, that he called motion an *entelecheia* three times, at the beginning, middle, and end of his explanation of what motion is, when he really meant not *entelecheia* but the transition or passage to *entelecheia*. This suggestion would be laughable if it were not what almost everyone who addresses the question today believes. Sir David Ross, certainly the most massively qualified authority on Aristotle of those who have lived in our century and written in our language, the man who supervised the Oxford University Press's forty-five year project of translating all the works of Aristotle into English, in a commentary on Aristotle's definition of motion, writes: "*entelecheia* must here mean 'actualization,' not 'actuality'; it is the passage to actuality that is *kinēsis*" (*Physics*, text with commentary, London, 1936, p. 359). In another book, his commentary on the *Metaphysics*, Ross makes it clear that he regards the meaning *entelecheia* has in every use Aristotle makes of it everywhere *but* in the definition of motion as being not only other than but incompatible with the meaning "actualization." In view of that fact, Ross' decision that "*entelecheia* must here mean 'actualization' " is a desperate one, indicating a despair of understanding Aristotle out of his own mouth. It is not translation or interpretation but plastic surgery.

Ross' full account of motion as actualization (*Aristotle*, New York, 1966, pp. 81-82) cites no passages from Aristotle, and no authorities, but patiently explains that motion is motion and cannot, therefore, be an actuality. There are authorities he could have cited, including Moses Maimonides, the twelfth century Jewish philosopher who sought to

reconcile Aristotle's philosophy with the Old Testament and Talmud, and who defined motion as "the transition from potentiality to actuality," and the most famous Aristotelian commentator of all time, Averroes, the twelfth century Spanish Moslem thinker, who called motion a passage from non-being to actuality and complete reality. In each case the circular definition is chosen in preference to the one which seems laden with contradictions. A circular statement, to the extent that it is circular, is at least not false, and can as a whole have some content: Descartes' definition amounts to saying "whatever motion is, it is possible only with respect to place," and that of Averroes, Maimonides, and Ross amounts to saying "whatever motion is, it results always in an actuality." An accurate rendering of Aristotle's definition would amount to saying (a) that motion is rest, and (b) that a potentiality, which must be, at a minimum, a privation of actuality, is at the same time that actuality of which it is the lack. There has been one major commentator on Aristotle who was prepared to take seriously and to make sense of both these claims.

St. Thomas Aquinas, in his interpretation of Aristotle's definition of motion, (*Commentary on Aristotle's Physics*, London, 1963, pp. 136-137), observes two principles: (1) that Aristotle meant what he wrote, and (2) that what Aristotle wrote is worth the effort of understanding. Writing a century after Maimonides and Averroes, Thomas disposes of their approach to defining motion with few words: it is not Aristotle's definition and it is an error. A passage, a transition, an actualization, an actualizing, or any of the more complex substantives to which translators have resorted which incorporate in some more or less disguised form some progressive sense united to the meaning of actuality, all have in common that they denote a kind of motion. *If* motion can be defined, then to rest content with explaining motion as a kind of motion is certainly to err; even if one is to reject Aristotle's definition on fundamental philosophical grounds, as Descartes was to do, the first step must be to see what it means. And Thomas explains clearly and simply a sense in which Aristotle's definition is both free of contradiction and genuinely a definition of motion. One must simply see that the growing puppy *is* a dog, that the half-formed lump of bronze on which the sculptor is working *is* a statue of Hermes, that the tepid water on the fire *is* hot; what it *means* to say that the puppy is growing, the bronze is being worked, or the water is being heated, is that each is not just the complex of characteristics it possesses right now; in each case, something that the thing is not yet, already belongs to it as that toward which it is, right now, ordered. To say that something is in motion is just to say that it is *both* what it is already and something else that it isn't yet. What else do we mean by saying that the puppy is growing, rather than remaining what it is, that the bronze under the sculptor's hand is in a different condition from the identically shaped lump of bronze he has discarded, or that the water is not just tepid but being heated? Motion is the mode in which the future belongs to the present, is the present absence of just those particular absent things which are about to be.

Thomas discusses in detail the example of the water being heated. Assume it to have started cold, and to have been heated so far to room temperature. The heat it now has, which has replaced the potentiality it previously had to be just that hot, belongs to it in actuality. The capacity it has to be still hotter belongs to it in potentiality. To the extent that it is actually hot it has been moved; to the extent that it is not yet as hot as it is going to be, it is not yet moved. The motion is just the joint presence of potentiality and actuality with respect to same thing, in this case heat. A number of things need to be noted here.

In Thomas' version of Aristotle's definition one can see the alternative to Descartes' approach to physics. Since Descartes regards motion as ultimate and given, his physics will give no account of motion itself, but describe the transient static configurations through which the moving things pass. By Thomas' account, motion is not ultimate but is a consequence of the way in which present states of things are ordered toward other actualities which do not belong to them. One could build on such an account a physics of forces, that is of those directed potentialities which cause a thing to move, to pass over from the actuality it possesses to another which it lacks but to which it is ordered. Motion will thus not have to be understood as the mysterious departure of things from

rest, which alone can be described, but as the outcome of the action upon one another of divergent and conflicting innate tendencies of things. Rest will be the anomaly, since things will be understood as so constituted by nature as to pass over of themselves into certain states of activity, but states of rest will be explainable as dynamic states of balance among things with opposed tendencies. Leibniz, who criticized Descartes' physics and invented a science of dynamics, explicitly acknowledged his debt to Aristotle (see, e.g., *Specimen Dynamicum*), whose doctrine of *entelecheia* he regarded himself as restoring in a modified form. From Leibniz we derive our current notions of potential and kinetic energy, whose very names, pointing to the actuality which is potential and the actuality which is motion, preserve the Thomistic resolutions of the two paradoxes in Aristotle's definition of motion.

But though the modern science of dynamics can be seen in germ in St. Thomas' discussion of motion, it can be seen also to reveal difficulties in Thomas' conclusions. According to Thomas, actuality and potentiality do not exclude one another but co-exist as motion. To the extent that an actuality is also a potentiality it is a motion, and to the extent that an actuality is a motion it is a potentiality. The two seeming contradictions cancel each other in the dynamic actuality of the present state which is determined by its own future. But are not potential and kinetic energy two different things? The rock which I hold six feet above the ground has been actually moved identically to the rock which I have thrown six feet above the ground, and at that distance each strains identically to fall to earth; but the one *is* falling and the other isn't. How can the description which is common to both, when one is moving and the other is at rest, be an account of what motion is? It seems that everything which Thomas says about the tepid water which is being heated can be said also of the tepid water which has been removed from the fire. Each is a coincidence of a certain actuality of heat with a further potentiality to the same heat. What does it mean to say that the water on the fire has, right now, an order to further heat which the water off the fire lacks? If we say that the fire is acting on the one and not on the other in such a way as to disturb its present state, we have begged the question and returned to the position of presupposing motion to explain motion. Thomas' account of Aristotle's definition of motion, though immeasurably superior to that of Sir David Ross as interpretation, and far more sophisticated as an approach to and specification of the conditions an account of motion would have to meet, seems ultimately subject to the same circularity. Maimonides, Averroes, and Ross fail to say how motion differs from rest. Thomas fails to say how any given motion differs from a corresponding state of balanced tension, or of strain and constraint.

The strength of Thomas' interpretation of the definition of motion comes from his taking every word seriously. When Ross discusses Aristotle's definition, he gives no indication of why the *hē toiouton*, or "insofar as it is such," clause should have been included. By Thomas' account, motion is the actuality of any potentiality which is nevertheless still a potentiality. It is the actuality which has not cancelled its corresponding potentiality but exists along with it. Motion then is the actuality of any potentiality, insofar as it is still a potentiality. This is the formula which applies equally well to the dynamic state of rest and the dynamic state of motion. We shall try to advance our understanding by being still more careful about the meaning of the pronoun *hē*.

Thomas' account of the meaning of Aristotle's definition forces him to construe the grammar of the definition in such a way that the clause introduced by the dative singular feminine relative pronoun *hē* has as its antecedent, in two cases, the neuter participle *tou ontos*, and in the third, the neuter substantive adjective *tou dunatou*. It is true that this particular feminine relative pronoun often had an adverbial sense to which its gender was irrelevant, but in the three statements of the definition of motion there is no verb but *estin*. If the clause is understood adverbially, then, the sentence must mean something like: if motion is a potentiality, it is the actuality of a potentiality. Whatever that might mean, it could at any rate not be a definition of motion. Thus the clause must be understood adjectivally, and Thomas must make the relative pronoun dependent upon a word with which it does not agree in gender. He makes the sentence say that motion is the actuality of the potentiality in which there

is yet potentiality. Reading the pronoun as dependent upon the feminine noun *entelecheia* with which it does agree, we find the sentence saying that motion is the actuality *as which* it is a potentiality of the potentiality, or the actuality as a potentiality of the potentiality.

This reading of the definition implies that potentialities exist in two ways, that it is possible to *be* a potentiality, yet not be an *actual* potentiality. I said at the beginning of this talk that Aristotle's definition of motion was made by putting together two terms, actuality and potentiality, which normally contradict each other. Thomas resolved the contradiction by arguing that in every motion actuality and potentiality are mixed or blended, that the condition of becoming-hot of the water is just the simultaneous presence in the same water of some actuality of heat and some remaining potentiality of heat. I also said earlier that there was a qualifying clause in Aristotle's definition which seemed to intensify, rather than relieve, the contradiction. I was referring to the *hē toiouton*, or *hē kinēton*, or *hē dunaton*, which appears in each version of the definition, and which, being as I have claimed grammatically dependent on *entelecheia*, signifies something the very actuality of which is potentiality. The Thomistic blend of actuality and potentiality has the characteristic that, to the extent that it is actual it is not potential and to the extent that it is potential it is not actual; the hotter the water is, the less is it potentially hot, and the cooler it is, the less is it actually, the more potentially, hot.

The most serious defect in Saint Thomas' interpretation of Aristotle's definition is that, like Ross' interpretation, it broadens, dilutes, cheapens, and trivializes the meaning of the word *entelecheia*. An immediate implication of the interpretations of both Thomas and Ross is that whatever happens to be the case right now is an *entelecheia*, as though being at 70 degrees Fahrenheit were an end determined by the nature of water, or as though something which is intrinsically so unstable as the instantaneous position of an arrow in flight deserved to be described by the word which Aristotle everywhere else reserves for complex organized states which persist, which hold out in being against internal and external causes tending to destroy them.

Aristotle's definition applies to any and every motion: the pencil falling to the floor, the white pages in the book turning yellow, the glue in the binding of the book being eaten by insects. Maimonides, Averroes, and Ross, who say that motion is always a transition or passage from potentiality to actuality, must call the being-on-the-floor of the pencil, the being-yellow of the pages, and the crumbled condition of the binding of the book actualities. Thomas, who says that motion is constituted at any moment by the joint presence of actuality and potentiality, is in a still worse position: he must call every position of the pencil on the way to the floor, every color of the pages on the way to being yellow, and every loss of a crumb from the binding an actuality. If these are actualities, then it is no wonder that philosophers such as Descartes rejected Aristotle's account of motion as a useless redundancy, saying no more than that whatever changes changes into that into which it changes.

We know however that the things Aristotle called actualities are limited in number, and constitute the world in its ordered finitude rather than in its random particularity. The actuality of the adult horse is one, although horses are many and all different from each other. Books and pencils are not actualities at all, even though they are organized wholes, since their organizations are products of human art, and they maintain themselves not as books and pencils but only as earth. Even the organized content of a book, such as that of the first three chapters of Book Three of Aristotle's *Physics*, does not exist as an actuality, since it is only the new labor of each new reader that gives being to that content, in this case a very difficult labor. By this strict test, the only actualities in the world, that is the only things which, by their own innate tendencies, maintain themselves in being as organized wholes, seem to be the animals and plants, the ever-the-same orbits of the ever-moving planets, and the universe as a whole. But Aristotle has said that every motion is an *entelecheia*; if we choose not to trivialize the meaning of *entelecheia* to make it applicable to motion, we must deepen our understanding of motion to make it applicable to the meaning of *entelecheia*.

In the *Metaphysics*, Aristotle argues that if there is a distinction between potentiality and actuality at all, there must be a distinction between two kinds of potentiality.

The man with sight, but with his eyes closed, differs from the blind man, although neither is seeing. The first man has the capacity to see, which the second man lacks. There are then potentialities as well as actualities in the world. But when the first man opens his eyes, has he lost the capacity to see? Obviously not; while he is seeing, his capacity to see is no longer merely a potentiality, but is a potentiality which has been put to work. The potentiality to see exists sometimes as active or at work, and sometimes as inactive or latent. But this example seems to get us no closer to understanding motion, since seeing is just one of those activities which is not a motion. Let us consider, then, a man's capacity to walk across the room. When he is sitting or standing or lying still, his capacity to walk is latent, like the sight of the man with his eyes closed; that capacity nevertheless has real being, distinguishing the man in question from a man who is crippled to the extent of having lost all potentiality to walk. When the man is walking across the room, his capacity to walk has been put to work. But while he is walking, what has happened to his capacity to be at the other side of the room, which was also latent before he began to walk? It too is a potentiality which has been put to work by the act of walking. Once he has reached the other side of the room, his potentiality to be there has been actualized in Ross' sense of the term, but while he is walking, his potentiality to be on the other side of the room is not merely latent, and is not yet cancelled by an actuality in the weak sense, the so-called actuality of being on that other side of the room; *while he is walking his potentiality to be on the other side of the room is actual just as a potentiality*. The actuality of the potentiality to be on the other side of the room, as just that potentiality, is nothing more nor less than the walking across the room.

A similar analysis will apply to any motion whatever. The growth of the puppy is not the actualization of its potentiality to be a dog, but the actuality of that potentiality as a potentiality. The falling of the pencil is the actuality of its potentiality to be on the floor, in actuality as just that: as a *potentiality* to be on the floor. In each case the motion is just the potentiality *qua* actual and the actuality *qua* potential. And the sense we thus give to the word *entelecheia* is not at odds with its other uses: a motion is like an animal in that it remains completely and exactly what it is through time. My walking across the room is no more a motion as the last step is being taken than at any earlier point. Every motion is a complex whole, an enduring unity which organizes distinct parts, such as the various positions through which the falling pencil passes. As parts of the motion of the pencil, these positions, though distinct, function identically in the ordered continuity determined by the potentiality of the pencil to be on the floor. Things have being to the extent that they are or are part of determinate wholes, so that to be means to be something, and change has being because it always is or is part of some determinate potentiality, at work and manifest in the world as change.

I shall close by considering the application of Aristotle's account of motion to two paradoxes famous in antiquity. Zeno argued in various ways that there is no motion. According to one of his arguments, the arrow in flight is always in some one place, therefore always at rest, and therefore never in motion. We can deduce from Aristotle's definition that Zeno has made the same error, technically called the fallacy of composition, as one who would argue that no animal is alive since its head, when cut off, is not alive, its blood, when drawn out, is not alive, its bones, when removed are not alive, and so on with each part in turn. The second paradox is one attributed to Heracleitus, and taken as proving that there is nothing but motion, that is, no identity, in the world. The saying goes that one cannot step into the same river twice. If the river flows, how can it continue to be itself? But the flux of the river, like the flight of the arrow, is an actuality of just the kind Aristotle formulates in his definition of motion. The river is always the same, as a *river*, precisely because it is never the same as water. To be a river is to be the always identical actuality of the potentiality of water to be in the sea.

Joe Sachs graduated from St. John's in 1968; he took his M.A. degree at Pennsylvania State University after graduate studies at the New School for Social Research, New York; he was a teaching assistant at Penn State and became a tutor at St. John's in 1975. This is the text of an informal lecture delivered to the summer freshmen in Annapolis on July 6, 1975.

Commencement Address

Graduate Institute in Liberal Education

August 15, 1975

by Eva Brann

Candidates for the degree of Master of Arts, Friends and Relatives, Fellow Tutors and Guests of St. John's College:

When it first came home to me that I would not be a tutor at the Graduate Institute in Liberal Education this summer, I felt great twinges of regret—regret that I might not see some of you again and regret that I was not to be a part of that exhilarating exercise taking place up here, on the slopes of Sun Mountain. So I was only too glad to accept the Director's invitation to come at least for this occasion, and in the dead of an Eastern winter I sat down to compose my ticket of admission—this commencement address.

I had a suspicion that I knew just why he had asked me to come; namely precisely because I had found last summer so thoroughly exhilarating and, on the whole, successful. So it seemed to me that I was called upon to examine the ingredients of that excitement and that success.

Of course, as I face you now, I realize what a risky undertaking that will be. After all, I have not been with you through this summer, so what do I know of who grew disenchanted with what or with whom, when and for what reasons? Therefore I have to make my speech in the blind hope that most of you have had, when all is said and done, three or four grand summers.

Let me start my analysis from the outside (as it were), from the most external aspect of this enterprise, and go from there to what I think of as its center.

This outside aspect is the location of the institute in New Mexico, in the Southwest—for many of us a strange and even fabulous part of the United States.

Last summer one of our students, now a graduate, was a man who was an experienced pilot. A number of us had the good fortune to be taken by him for week-end flights over the four-corner country, where New Mexico, Utah, Colorado and Arizona touch. We swooped about like mechanized gods in a ridiculous flying contraption—once we were forced down by a bumble bee which had clogged our speedometer duct—and saw a country whose vast-scaled features can only be taken in from above; no ordinary earth-crawling mortal could see enough of it to apprehend its shape. So our view and our scale expanded and expanded. It was a truly fabulous land insofar as every account of it must appear like a fable. For here nature herself had taken to the arts, to building, sculpting, painting. We saw a rock lying on the desert like a majestic ship: Shiprock of the Navahoes; we saw a land covered with the most delicately colored ripple design: the Painted Desert; we saw an enormous park of magnificent columns and arches: Monument Valley.

But the ship had no destination, and the painting no intention, and the monuments commemorated nothing. From this point of view each natural panorama appeared as a stupendous mockery of human work, whose soulless, unchanging shapes, with their violent and yet predictable moods, seemed repellent and hostile to the human spirit. We began to understand why the local painters so often produce such dreadful, lurid pictures—it is because they have been anticipated and outdone by the very nature they are supposed to inform with meaning. So in defense we drew in on ourselves and seemed to become particularly attentive friends during that adventure.

I thought I noticed something similar here on the campus: at first we were all avid and wide-eyed sight-seers, but once we had seen the sights, we stayed home and made music and conversation. It reminded me of a Platonic dialogue, namely the *Phaedrus*, the only dialogue which takes place in the country, outside the walls of the city. In this setting Socrates behaves like a well-informed foreigner. "I am a lover of learning," he explains, "and trees and open country won't teach me anything, while the people in town do." And so it seems to me in general, that the enterprise of education needs enclosure and density, and that the very expansive grandeur of this sky

and this land, by driving us inward, makes a perfect summer setting for the kind of learning Socrates means.

So much for our surroundings; what about the people who belong within this enclosure of learning (I am referring to the Graduate Institute), the people who, Socrates says, are his teachers?

What is most striking about the members of the Institute is their variety and distinctiveness.

The *distinctiveness* is largely the result of age. Our students here are adults when they come, as they are adults when they leave. For a teacher used to undergraduates this makes for a noticeable difference. The difference is not in the way classes go—they are remarkably like those in the winter school, since the advantages older students have in experience are often cancelled by their reserve, and the advantages younger students have in freshness are balanced by the better application of the graduate students. The difference is much more in *what* the students are. Young students are distinguished from each other by the adventures they have had, but older students are distinguished by the moral decisions they have made. It takes a while to learn of these, but I have met people here who have changed their profession because they learned that their advanced training required them to do what they considered indecent, and others who had devoted the last ten years of their lives to the laborious acquisition of a night-school degree, and still others who have deliberately committed their next ten years to the great plan of founding a school which would be exactly what their children needed.

The *variety* of the Institute's students, on the other hand, is much more immediately striking, especially to me, because I have this last winter visited a number of good liberal arts colleges and observed the wisely-fed, well-doctored, regularly-exercised, casually expensive normality of shape and dress that is prevalent among their undergraduates. In contrast we here come broad and narrow, tall and short, gaudy and drab, elegant and dowdy. That variety is, of course, a sign of the variety of our origins: our summer community up here is a community-in-diversity.

Like all my fellow-tutors I found these differences in our students not only invigorating but peculiarly appropriate to our undertaking—to graduate liberal education.

I am probably about to say what some of you cannot agree with at all. But to say what everyone agrees with is to say nothing at all—and it would seem almost like adding insult to injury to make you sit here in your black heat-absorbent gowns to listen to nothing. Perhaps I can at least make you feel nostalgic for those many seminars which you have left feeling deeply dissatisfied with the opinions of your more vocal fellow-members.

So let me begin by saying that I do not believe that everyone in this enormous republic should be *like* everyone else or should be *with* everyone else, because that can only be done in terms of the lowest common denominator. But that denominator is so low that all character is lost, since only those traits can be kept which offend no one. The compulsory public schools in very large systems are sad examples of this effect—Shakespeare's *Merchant of Venice* is removed because it offends some Jews, prayers disappear because religious libertarians object, discipline is adjusted to suit progressive parents. Everything has to be composed very carefully and inoffensively or made up anew, while boredom and irritation grow. It would seem to me better that people should have alternative places to go, places where they need not be so careful not to tread on each other's toes, where they can live loudly and merrily or silently and soberly, in tribes or alone, as suits them.

In stating this preference, I may seem to be ripe for certain modern "movements"—those toward "individual liberation" on the one hand and "ethnic identity" on the other. But in fact, I have the greatest doubts about them both. For I think we have, all of us, together, gone much too far toward losing our innocence for such crude salvations. And I think that this Institute, because of its setting, its people, and finally and most centrally, its program, is the place to come to terms with this fact. Here we live together in a comfortably temporary suspension of our working opinions and in friendly compromise of our living habits—for example, I confine my squeaking flute practice to an inoffensive hour and my neighbor kindly turns down her radio to an inaudible volume. Here we can think about what ought to be common and what ought to be separate.

Now it is easy to know what makes us all utterly the same and equal. If we came here overland we all travelled over well-numbered routes, keeping to the right of a white line and going, I trust, at exactly 55 miles per hour, that being the national speed limit. If we stopped to eat we knew what kind of standard stuff would come with our hamburger, like it or not. (I have a friend, a little boy, the joy of whose life it is to bring a certain imperial hamburger dispensary to a dead halt by asking for his hamburger *without* a pickle.) If we go to the drugstore in the Coronado Shopping Center, 1500 miles from home, we can home in on the paper clips without the least hesitation, because they are always in the stationery department.

De Tocqueville says in *Democracy in America* that Americans are, without knowing it, Cartesians in action. He is referring to the way they *direct their minds* toward *managing* their affairs. Those of you who have read Descartes' *Rules* in the "Mathematics and Natural Science" seminar, or even the *Meditations* in the Philosophy tutorial, will remember what way that is: just such a rational, departmentalizing, engineering way as has produced the well-organized, convenient sameness of our lives. We certainly owe our sameness largely to Cartesian principles.

But people get tired of this rule-ridden, rationalized, homogeneous world, and so they try to construct differ-

ences and distinctions. Merchandise, for instance, is "personalized," so that you can order a mug, say with your initials on it. Of course, those initials are stamped on before you ever order the mug—many J's and M's and very few X's and Y's, because few people are called Xavier and Yolanda and many people John and Mary. All kinds of "individualization" are, I think, only *sophisticated* sameness.

It seems to me to be at least *partly* the same with the "ethnic movements" as well. They are a reaction to our homogeneous lives, but a reaction on the same level and from the same source. The paraphernalia that go with them are certainly merchandise like any other. But what is more essential is that they were invented at the universities and think-tanks by people who have subjected the world to rational analysis. The very learnedness of the term "ethnic" shows this, as does its generality. The scholars who constructed the concept took the Greek word used in the New Testament to name the heathen nations and to make an invidious distinction between them and the People of the Covenant. But they took the derogatory sense out of it. Anyone (except perhaps those poor "Wasps") can be equally an "ethnic"—it is a difference without distinction.

Here is the point I want to make: It is too late for us to make an *innocent* and *naive* return either to youthfully spontaneous individuality or to venerably traditional ancestral ways. We are too much caught in the regularity, efficiency, and rationality of our Cartesian world. That is why our enthusiastic attempts in those directions always look a little like a costume party.

And yet I believe in some such return. I think most of us have a feeling that some sort of a new beginning is needed, and I have never heard of a true beginning which was *not* a return. What I want to claim is that a liberal education, like ours, here, this summer, is the beginning of that beginning.

Some people say that the correct meaning of the phrase "liberal education" is "food for the free." "Liberal" means "suitable for free people," and the word "education" has its root in common with our word "edible." I don't know if this etymology is correct, but I will use it to help me say something opposite: it seems to me that in modern times a first, preliminary function of a liberal education must be to serve as a purgative, a cleansing, of those who wish to be free. By its means we can cleanse ourselves of our undigested and unconscious prejudices, most of which turn out to be associated with just that rationalized sameness I was describing before. Isn't that just the effect which the study and discussion of Descartes, Rousseau, Hume, de Tocqueville and Marx had, if they had any?

But while such study sets us free from the *sameness of our regulated environment*, it also reveals to us what we have both truly *to ourselves* and truly *in common: our common human nature*. Let me give two examples taken from my experiences last summer.

The first will mean most to those of you who have taken the rewarding leap of doing the "Mathematics and Natural Science," and who have studied Euclidean and Non-Euclidean geometry. The Euclidean figures came very naturally—every child who draws stick-figures already implicitly sees their properties, and anyone, when asked a series of skillful questions, can, like Meno's slave boy, make Euclidean discoveries by consulting his imagination. But when we came to Non-Euclidean Geometry, although every figure and every theorem was perfectly *thinkable*, not one of us could honestly report that we were able to *imagine* a single Non-Euclidean property. For instance, we all understood that in this geometry no figures could be different in size and yet preserve the same shape, but we could not imagine this impossibility. Then we had a very lively discussion in which we concluded that the very ability to make images and figures different in size but the same in shape, was so deep and common a human characteristic that humanity might almost be tested by the presence of an image-making faculty, which would by its very nature be Euclidean. We concluded that human beings must have Euclideanism in common.

The second example comes from the "Politics and Society" seminar where we read Thomas Aquinas' *Treatise on Law*. To my happy surprise, it turned out to be the summer's most influential reading. I often wondered why that was so, and finally thought that it must be because our relation to eternal, natural, human and divine law was recognized by the members of the seminar as being both more their own and at the same time more a common concern than other, *apparently* exciting and current, social preoccupations. Thomas had evidently taught us terms which could become our common reference.

This then, seems to me to be what liberal education is for and what should happen in the course of liberal learning—and should continue to happen when its formal requirements have long since been completed:

First, that we should find ourselves enabled to break out of the web of learned slogans and engineered solutions in which we are enmeshed. Next, that we should search for the true roots of our own humanity in hopes of discovering *common* questions, establishing *common* terms and formulating possible *common* answers. And finally, that we should be moved to make a deep-felt, thoughtful return to our own affairs and take up our narrower loyalties to ourselves, to our ancestry, or just to our daily associations, not by being helplessly and witlessly driven into them, but by free choice.

So I think I can summarize the ingredients of the summer's exhilaration in this way: there was the grandness of our setting, which made us expand and yet pay more attention to one another; there was the variety and distinctiveness of our participants, which made them the best sort of partners in learning; and finally there was that commonality, rooted in single human souls, which is the beginning and the end of this program of liberal education.

You have completed the formal requirements of this program, and are about to enter the degree of Master of the arts which make a liberal education possible. That degree is given for practical and professional purposes, and you certainly have, through three or four hard-working summers, earned that reward. For my part, I have never been able to see why a thing that is good in itself—a liberal education—should not also have ordinary profitable consequences. I therefore wish you the very best of luck in your careers and I earnestly hope that your plans may work out and that your expectations may be realized.

Still, speaking among ourselves, good as it is to *have* a Master of Arts, it would be ridiculous to claim to *be* one, for the free arts are exactly such as can have no masters, only devoted practitioners. And therefore let me now welcome you, who are about to be alumni, to the permanent part of St. John's College, not as *Masters*, but as *Fellow-lovers* of liberal learning.

CAMPUS—ALUMNI NEWS

Spaeth Speaks

Tutor Robert L. Spaeth of the Annapolis campus was a speaker during the 1975 Frontiers in Education Conference, held at the Georgia Institute of Technology in Atlanta during October. Mr. Spaeth's topic was "St. John's College: One Culture," part of a conference segment entitled "Humanities-Engineering Bridge: Two-Way Traffic, Present and Future."

Zollars Honored

Gerald F. Zollars, director of admissions for the Santa Fe campus, has been awarded a certificate of appreciation by the National Association of College Admissions Counselors for outstanding and dedicated service during his two years as chairman of the NACAC Self-Study Task Force Subcommittee on Composition and Funding.

The Subcommittee was charged with studying the membership, the working relationships of the state and regional associations with the national office, the budget of the association, and the roles of the national office and the national officers. After completing the study the Subcommittee submitted a report to the Task Force making recommendations for changes in the governance and structure of the NACAC.

Serving with Zollars were H. Leonard Richardson, headmaster of the Katherine Branson School; Aline Rivers, director of admissions at Fisk University; Carolyn Ruley, director of guidance, Wyoming High School, Cincinnati, Ohio; and Bud Nicholson, associate director of admissions, University of Denver.

Alumni Chapters Stirring

Three local area chapters of the Alumni Association have been active this year in organizing seminars led by tutors from the Annapolis campus.

The New York Area Group started its eighth consecutive year of organized activity with a seminar on Jane Austen's *Mansfield Park*, led by Miss Eva Brann, on 12 November. Under the capable direction of Mary (Bittner) Wiseman '58, the group plans several other events, both academic and social, between now and May.

Up in the land of the bean and the cod, the Boston alumni played host to Tutor Samuel S. Kutler '54, who conducted a seminar on *The Symposium* on 22 November. If not the first time ever, this was the first seminar in a very long time in Boston; we hope interest will make it the first of a long series. John Adcock '64 was the local coordinator, with assistance from Hank '70 and Christine (Ferrarini) '72 Constantine.

And we are pleased to report that the Washington, D. C. chapter is up and about again, thanks to Georgetown medical student Daniel S. Pearl '73. On 16 December Laurence Berns of the Annapolis faculty conducted a seminar on Francis Bacon's *New Organon* and *The New Atlantis*. Plans have already been made for additional seminars in February and April.

Are there other areas where alumni want seminars? If so, let Tom Parran, Director of Alumni Activities, know about it. There are tutors ready and willing to participate in these regional activities; all that is needed is an indication of interest from alumni in that region, and one key person willing to make the necessary local arrangements, such as a meeting place.

How about it, Philadelphia or Chicago?

Institute Graduates 25

At ceremonies on the Santa Fe campus on 15 August, twenty-five students of the Graduate Institute, their course work and essays completed, received their Master of Arts degrees from President Richard D. Weigle.

Annapolis tutor Eva Brann, at the invitation of the students themselves, delivered the commencement address (see text elsewhere in this issue).

The graduates and their hometowns are as follows:

From New Mexico:

Roberta Ross Fine, Tesque; James G. Gage, Albuquerque; Paulette Donovan Gage, Albuquerque; Teresina Gallegos de Lucero, Santa Fe; Grace Anna McNeley, Ramah; Justin R. Moore, Taos.

From Maryland:

Evelyn Patterson Burrell, Baltimore; Don Franklin Lee, Hyattsville; Janice Marie Simmons, Hyattsville; Megan Tyndall, Annapolis.

From New York:

Frances Wilhelmenia Haywood, New York City; Trumilla S. Johnson, Roosevelt.

From Texas:

Peter Stephen Kovatis, Austin; Darrold K. Smith, Austin.

Miscellaneous:

Joseph Clifton Andrews, Lawrenceville, Va.; Carol Hinds, Leavenworth, Kan.; Miriam Beth Kalis, Des Moines, Ia.; Daniel I. Powell, Jr., Columbus, Ohio; Franz Snyder, Berkeley, Cal.; Marion Diane Stieghorst, Littleton, Col.; Gail Tapscott, Washington, D.C.; Gene F. Taylor, Huntsville, Ala.; Philip Joseph Valley, Manchester, N.H.; Karen Lucetta Wilkes, Norridge, Ill.; Janet M. Works, St. Louis, Mo.

Homecoming 1975

It takes only one good reunion class to set the tone for a successful Homecoming, and again this year there was such a class. 1950 was, as the vintners say, a very good year, and an account of its reunion is found elsewhere on these pages. And it was a successful weekend.

Counterclockwise, from the left: Jim Dugan '26, guest Hookie Weiskittel, Lutie Tall '21, Funk DeSantis '27, Heinie Wegner '26, Wes Everett '22 (standing), Jim Miller '28, Roland King '25.

It started on Friday with a lecture by a member of the class of 1950, Thomas K. Simpson of the Santa Fe faculty (see lead article), followed by an informal "beer and conversation," with alumni, seniors, and faculty gathering in the basement of Chase-Stone House until rather late hours.

On Saturday morning there were two Alumni Seminars, a special for the reunion class, and the regular seminar; this latter was co-led by Miss Eva Brann and Mr. William O'Grady in a lively discussion of Friedrich Nietzsche's *Die Fröhliche Wissenschaft*. Alumni are grateful to these tutors for giving so generously of their time.

The annual meeting after lunch was presided over by William W. Simmons '48, elected in September to fill the unexpired term of Bernard F. Gessner '27, who had resigned at that time. Four directors of the Association were re-elected: Marcia (DelPlain) Reff '57, Patrica (White) von Schwerdtner '70, William F. Cone '67, and Edward T. Heise '36. In a brief ceremony Mr. Simmons presented Mr. Gessner with a pewter bowl as a tribute from the Association. [In November Mrs. Reff was elected Executive Vice President to fill the place vacated by Mr. Simmons.]

There followed a lively discussion of the pros and cons of a new Alumni Register; the conclusion, formalized by a vote of the membership, was that the College should publish such a register within a year.

A counseling session for students was staged by the alumni after the meeting. Carol (Phillips) Tilles '59, in cooperation with Counseling and Placement Director Brenda Robertson, presented a panel of alumni 'guest experts', with particular emphasis on the legal and medical professions.

The now-annual Alumni-Student Soccer confrontation turned out to be rather an unequal one; when the shouting died down the score was Students 6, Alumni 1. Something was said about an aging alumni goalie: true, Bryce?

The final Homecoming event was the reception and banquet at the Annapolis Hilton Inn. A rather complete program featured the Class of 1950 and its honors to Tutor Robert S. Bart (see story on 1950 reunion), presentation of the Alumni Award of Merit to Col. Thomas W. Ligon of the Class of 1916, and honors by the entire Alumni Association to Ford K. Brown, Tutor Emeritus.

Association President William Simmons reads citation to Award of Merit winner Col. Thomas W. Ligon (right).

Col. Ligon's citaton read in part: "His professional achievements, together with his distinguished service to the College on behalf of its Alumni, honor him and this Association." Col. Ligon served for two years in the late 1950's as volunteer Alumni Secretary of the College, and was responsible for revitalizing the Alumni Annual Giving Campaign.

Ford K. Brown celebrated in 1975 two major events: his 80th birthday and the completion of 50 years with St. John's College. It was primarily for the latter that the Association directors decided to honor him as their special guest at Homecoming. There was some tale-spinning by alumni who had known Mr. Brown over the years, tales perhaps slightly apocryphal, but catching the flavor of the love and esteem which the alumni feel for this good man and beloved teacher. Association President Bill Simmons presented Mr. Brown a silver bowl inscribed: "Ford K. Brown, teacher and friend, 50 years, St. John's Alumni."

The ceremony ended with the Reverend J. Winfree Smith of the faculty reading a poem to Mr. Brown by Albert Irwin Rusteberg '30, who was unable to attend the banquet. (See text elsewhere on these pages.) It was a fitting end to a fine Homecoming celebration.

A SPECIAL POEM TO FORD K. BROWN

As a finale to the ceremony honoring Ford K. Brown at the Homecoming banquet, J. Winfree Smith read the following poem which had been submitted by Albert Irwin Rusteberg of the class of 1930; unfortunately, "Rusty" had to be out of town that day. Here, with no apologies to Ogden Nash, is the poem:

Ford K. Brown

While we're having a final homecoming drink,
We can't help but sit back, relax, and think

Of the only tutor who's here that we know,
Was a St. John's professor a half century ago.

Much has been said and many quotes follow,
Of this man who came as a promising Rhodes scholar.

His teaching career had scarcely begun,
When he attained his Zenith in more ways than one.

He saw the school struggle through fat and lean days,
And helped out the Navy in numerous ways.

He saw regimes come, and saw regimes go,
In Annapolis and Santa Fe, New Mexico.

His knowledge and wisdom and wit still delight us,
And that's in spite of his cursed arthritis.

As we raise our glasses high above you,
What more can we say but "Ford K., we love you!"

Albert I. Rusteberg '30

Know Your Directors

In response to Association president Bill Simmon's plea at Homecoming for greater visibility for alumni, we thought it appropriate to introduce the directors of the Alumni Association to their constituents.

The officers will be introduced in this issue, followed in subsequent issues by the other directors. These, then, are the men and women who guide the Alumni Association:

Our president, *William W. Simmons* '48 is married to the former Anne McKay, lives in Severna Park, Md., and works in Annapolis. He is currently vice president of Fawcett Boat Supplies, Inc., a ship's chandlery serving the Chesapeake Bay area. Bill has been a director since 1970, and has served as treasurer and executive vice president. He was elected to the Board of Visitors and Governors last year.

The new executive vice president is *Marcia (DelPlain) Reff* '57. After two years at St. John's Marcia completed her studies at Brooklyn College. She moved to Maryland after teaching in New York, and for the past six years has taught at the McDonogh School near Baltimore. Her son, Michael O'Mahoney, is a junior at St. John's. Marcia's husband is Dr. Martin Reff, dean of the faculty at the Community College of Baltimore. The Reffs live in Towson, Md.

Edward F. Lathrop '38, secretary of the Association, has been involved with the College off and on since graduation, and most recently and directly on the board of directors since 1973. He has been secretary since October 1974. Ned has been an athletic coach and tutor at St. John's, served as alumni secretary for the College, and as a director of the Association on several occasions. A retired Navy captain, Ned and his wife, the former Kitty Strange, live in Annapolis.

Carol (Phillips) Tilles '59 (Mrs. William R.) is a homemaker and mother who lives in Severna Park and works for the Archivist of the State of Maryland. Her husband was a classmate, and is a past president of the Association. Carol has served on the board of directors since 1972, and has been its treasurer since 1974.

Alumni Seek Greater Visibility

[The following, reprinted with permission from the November 1975 issue of *The St. John's Reporter*, was written by John Rogers of the class of 1975]:

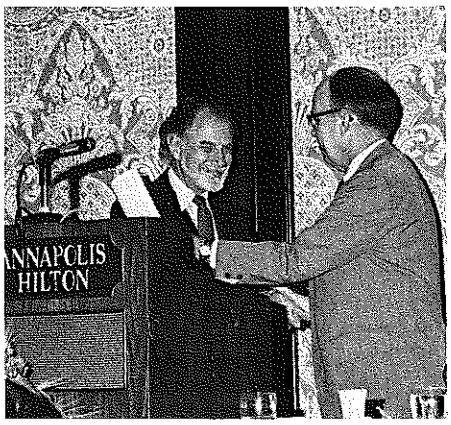
Failure to publicize more fully the accomplishments of St. John's alumni was scored by William W. Simmons, president of the Alumni Association, at a joint meeting between the college's Board of Visitors and Governors and association directors during homecoming weekend.

The meeting, the first of its kind, originally had been suggested by Mr. Simmons to inform the board more extensively of the alumni efforts in recruiting, career counseling and fund raising.

"Alumni have always been involved in counseling," remarked Carol Phillips Tilles, '59, who, as chairman of the association's counseling and placement committee, works with Brenda Robertson, the college's counseling and placement officer. "The association can maximize this counseling."

She described efforts in recent years to bring together students interested in particular fields and alumni who have entered them. The placement office maintains a counseling file of alumni and their professions.

"The association can provide a structure of communication that can be very



Robert Bart (left) receives scroll from Jack Carr.

helpful for Ms. Robertson and the students," Mrs. Tilles concluded.

Marianne DeCamillis Braun, '58, cited "facilitating contact between alumni and prospectives" as her concern in working with Joanne Aitken, director of admissions. Ms. Aitken affirmed that alumni are the best source of information for prospective students and that she and Mrs. Braun are attempting to increase alumni assistance.

Bernard Gessner, '27, gave a brief account of the alumni history of financially supporting the college, tracing it from Francis Scott Key's concern in 1827 for "the mouldering walls of McDowell." Mr. Gessner hopes the association will be able to raise $75,000 during the current year.

In concluding his remarks to the board, Mr. Simmons expressed concern that the alumni achieve a greater visibility. He characterized St. John's as divided into two communities: the "on-campus" community of faculty and students and the "off-campus" community of alumni and the board.

The latter suffers from under-representation in the college's publications, he said. He suggested that changes be made or publications be added to correct the situation.

"Our graduates are everywhere," he concluded. "Making them visible to each other and to the world would make them beneficial for recruiting, counseling and fund raising."

25 FOR '50

Not only was it the twenty-fifth anniversary reunion for the class of 1950, but twenty-five alumni who had graduated with the class showed up for the celebration!

And a real celebration it was, carefully planned for almost a year by a committee consisting of Jack Carr, Bernard Fleischmann, Theodore Hendricks, and Peter Whipple.

The impact of the class on Homecoming weekend was evident right from the start: the lecture Friday evening was delivered by Thomas K. Simpson, a member of the class now on the faculty in Santa Fe. He was introduced by Mr. Fleischmann. On Saturday morning a special seminar was held for the class, led by Robert S. Bart, Annapolis tutor on exchange to Santa Fe for this semester, and Robert Goldwin '50, former dean in Annapolis and now a special consultant to President Ford.

At the banquet Saturday night, the Reverend Frederick Beardsley '50 gave the pre-dinner invocation. In ceremonies after the meal, the class paid tribute to Mr. Bart, who came to St. John's when the class of 1950 entered as freshmen. Ted Hendricks, as chairman of the reunion committee, spoke briefly and then called on Jack Carr to present a special handmade scroll to Mr. Bart (see text elsewhere on these pages), making him an honorary member of the class.

And the effect of the presence of the class of 1950 was still being felt the next day, when the Reverend G. Harris Collingwood, a '48er who graduated in '50, delivered the 11 a.m. sermon at St. Anne's Church. Mr. Collingwood was introduced by the Reverend J. Winfree Smith of the faculty.

The Class of 1950, in celebration of its
Silver Jubilee
hereby proclaims

ROBERT S. BART, TUTOR,

to be an
Honorary Member
of that Class, with all the rights
and privileges pertaining thereunto.
Because you started with us when we came
as Freshmen in 1946;
Because, for four years, you learned with us
and taught us how to learn;
Because, for thirty years, you have continued
to learn and to teach and to love this college;
We honor you on this, the
Twenty-Fifth Anniversary
of our graduation, and count you among our own.

Given this 25th day of
October, 1975
St. John's College
Annapolis, Maryland

Alumni Authors to be Recognized

Charlotte Fletcher, Librarian, and William W. Simmons '48, president of the Alumni Association, have announced the establishment of the *Alumni Authors Collection*. The collection, to be housed in the Library on the Annapolis campus, will consist of the published works of alumni and alumnae authors. Miss Fletcher and Mr. Simmons stated that the collection will give recognition to considerable body of works by alumni of St. John's.

"I have long believed that alumni of this college deserve more recognition than they have thus far received," said Mr. Simmons. "This collection of works will acknowledge publicly the efforts of our alumni writers. On behalf of all alumni, I want to thank Miss Fletcher for her interest and cooperation in making this collection a reality."

Alumni works already in possession of the Library will, of course, form the nucleus of the new collection. Among the authors currently represented are: Philip L. Alger '12, Alvin A. Aronson '52, Louis L. Snyder '28, Robert Lewis '37, Robert L. Campbell '45, and Frederick S. Wildman, Jr. '53.

A most sincere invitation for contributions is therefore issued to all alumni and alumnae who have had works published. The only criterion for submissions is that all books must have been published and copyrighted; unfortunately, there is not enough storage space for unpublished manuscripts in the Library.

It is recognized, moreover, that many alumni authors write not for publication but for performance; for that reason, scripts of plays for all media, provided they have been performed publicly and are copyrighted, are most welcome. Similarly, scores of musical compositions which have been performed publicly and have been copyrighted will also be accepted. The only request is that scripts and scores be bound in some permanent fashion to preserve them.

While the exact location of the collection in the Library was still being discussed as this went to press, it will probably be shelved in the L-shaped room on the second floor, near the elevator and the Alumni Room. (Although the Alumni Room might seem a more appropriate spot, the cases there already house the collection of the late Peter Jackson '43 and the College's other rare books.)

Inquiries about the new collection may be addressed to Tom Parran, Director of Alumni Activities. All works intended for the collection should be addressed to: Alumni Authors Collection, The Library, St. John's College, Annapolis, Maryland 21404.

Then on Sunday evening, John J. Logue '50 gave an informal lecture on the topic, "The Trillion Dollar Opportunity: Peace, Ecology, and Ocean Wealth." Mr. Logue is a professor of political science and director, World Order Research Institute, Villanova University.

Among the members of the class unable to attend the reunion was Patrick D. Davis, who became a father for the first time just one week before Homecoming: Master Justinian Adrian Davis was born on October 17th in Seattle, Washington.

A number of the reunion group were combining Homecoming with visits with offspring currently students at the College: Harris Collingwood, daughter Marjorie; Jim Frame, daughter Shannah; Ted Hendricks, son Ted; and Bro Herrod, son Ralph.

And as a final reminder of the "25 for '50" group, a week later Myron Wolbarsht delivered an informal lecture, "Visual Perception," at the College. Myron is professor and director of research, Department of Ophthalmology, Duke University Medical Center.

Now—Class of 1951, where are you?

CLASS NOTES

1922

Dr. *Rafael Rodriguez de la Seda y Molina* is listed in *Who's Who in the World*, 2nd edition, 1974-75. Dr. Rodriguez-Molina is honorary professor of clinical medicine at the University of Puerto Rico School of Medicine. His entire professional life has been devoted to the study of tropical diseases endemic to his native island. Many of his writings have appeared in contemporary medical textbooks, including *Principles of Internal Medicine*, McGraw-Hill, 1962.

1931

Edwin L. Lotz, vice president and research director for the Burlington Glass Fabrics division of Burlington Industries, has retired from the company after a 37-year career. Ed was elected to the National Lacrosse Hall of Fame in 1967. He and his wife, the former Kathleen Jones, have three children.

1938

Francis E. Barkman writes that he is now serving as visiting professor of law at Gonzaga University School of Law, Spokane, Wash.

The newly-elected treasurer-business manager of the Annapolis Fine Arts Foundation, Inc., is *Julius Rosenberg*.

1942

Journet Kahn is now teaching both social sciences and humanities in the divisional-type great books program at Shimer College. He has developed a growing interest in adult education.

Among the newer Maryland Eastern Shoremen are Doris and *Tom Parran*. In October they moved to a small home in Queen Anne's County, on Greenwood Creek, from which he commutes to the College. Tom claims the Land of Pleasant Living really is more pleasant east of the Bay.

1943

Our apologies to *Douglas Buchanan* and to *Sam Sheinkman* '46 for failure to cover the talk they gave, more or less jointly, on psychiatry last May, here at the College. Doug is with the Psychiatric Department, Newport Hospital, Newport, R. I., and claims his visit to Annapolis was like old home week, seeing *"Peter" Kellogg-Smith, Phil Camponeschi* '46, and Mrs. James S. Martin.

1944

Warren Zeik is among our alumni authors (how about contributing to the new Collection, Warren?) with *The Root and the Branch*, edited with Rabbi Martin Siegel, Roth Pub., 1973; *New Christian Communities*, Roth Pub., 1973, and a novel, "a St. John's-type fantasy," called *The Karma Machine*, under the penname Michael Davidson, Popular Library paper-back, 1975.

1947

A Communicard from *Arthur O. "Pete" Davis* tells us that he is married, has two children, Linda, 11 and Susan, 13, and is Director of Monitoring Services at the Montgomery County (Ohio) Children Services Board.

1950

The Fall 1975 issue of *The Harley Record*, by The Harley School, Rochester, N.Y., features *Matson G. "Bud" Ewell*. Bud is, we believe, still headmaster of the Upper School. Those of you who remember the ketch which Bud started under the tutelage of the late Franz Plunder will be interested in knowing that she is still in Bud's backyard, slowly, carefully, being fitted and crafted in a way Franz would surely approve. Truly a hobby of a lifetime.

1949

Aaron Bisberg reports with more than pardonable pride the receipt by his wife, Ruth, of her bachelor's degree from the College of White Plains after years of hard labor. To quote Aaron, "no one more proudly wore, nor did any husband more proudly view, a cap and gown."

1952

Walter Schatzberg is a professor of German and comparative literature, and is chairman of the Department of Foreign Languages and Literatures, at Clark University in Worcester, Mass.

1957

Information comes to us indirectly that *Jack Nadol* is now deputy assistant administrator for regulations, Office of Federal Procurement Policy, Office of Management and Budget, in Washington, D. C.

1962

A press release from Penn State advises that *Robert A. Licht* is in receipt of the Ph.D. degree in philosophy from that institution.

1963

The Communicard continues to pay off; *Barbara (Lind) Anderson* writes that she has been living in Santa Fe for the past ten years, is married to Brian Anderson, a blacksmith (who is finishing a pair of iron gates for the Smithsonian Institution), and that they have a son, Colin, 5, and a daughter Casey, 3.

1964

Already reported in *The Reporter* from the Annapolis campus, but worthy of repetition, is news of the $65,000 National Science Foundation grant won this year by *William P. Banks*. The money will fund a two-year project which Bill will conduct on human visual perception. During this semester Bill is at Johns Hopkins, and is a frequent visitor to St. John's, serving as a consultant to a faculty study group preparing a new course on perception.

John P. Hetland, a systems analyst by vocation and a singer by avocation, is director of the Renaissance Street Singers, a group of 10-20 people who perform the music of cathedrals and monasteries in equally drafty places such as streets, parks, subways, and doorways in New York City on Sunday afternoons.

Julie V. Wiggenhorn advises that she and Elisio Da Costa, an artist and designer, were married in August 1975. Julie works for A.T. &T., planning communications facilities.

1965

Vivian (Ronay) Barry tells us that she is halfway toward her Master's degree in city and regional planning. This past spring she won a national election for a 2-year term as student representative to the Board of Directors of the American Society of Planning Officials

1966

Ian M. Harris last spring completed his doctorate in philosophy of education at Temple University, and has received a teaching post in the Department of Community Education at the University of Wisconsin at Milwaukee.

The former *George F. Kramer* (SF) (as he was known when a student) informs us that he has resumed the name he was born with, and is now *George F. Bingham*. He and his wife Mary Vinton have one child, Joshua Warren Bingham, born 7 September 1975. George is an attorney with the Securities Investors Protection Corporation, a non-profit D.C. corporation designed to protect customers' accounts in the event of the failure of securities brokers.

Margaret (Baroniak) Ruppert, after reading the September issue of *The Reporter*, comments on the article on what alumni do: "Let's hear it for Motherhood. Just wonder how many alumnae have opted for Ph.T.—putting husband through (which I've just done) or dropped out of grad school for a baby (which I've just done). Daniel Peter Ruppert was born 7 April 1975—arriving seven weeks early he weighed 4 pounds 2 ounces at birth. He is now thriving, and the joy of our lives."

1967

Another recipient of a Penn State doctorate in philosophy is *David L. Levine;* David received his degree in August together with *Bob Licht* (see 1962).

1968

Regina Forsyth has successfully passed Exam I of the Chartered Financial Analysts Exams. There are two more to be passed before she can be made a full-fledged CFA. Meanwhile she works as a securities analyst for a life insurance company.

After completing medical school and the University of Maryland in 1972, followed by one year of general surgery and one year of neurology at the University of Rochester (N.Y.), Dr. *Sharon (Marselas) Landman* is now in her second year of neurosurgical residency at George Washington University Hospital in D. C. Sharon's first child was born last June, a daughter, Artemis. Her husband, Ronald, is an internist in private practice in Silver Spring, Md.

Constance (Weigle) Mann (SF) writes that she and husband Tom moved to Princeton, N. J., in the fall of 1974, where he teaches at Princeton Theological Seminary. Tom received his Ph.D. degree from Yale last spring. Connie works part-time at the Princeton Public Library, is taking courses at the YWCA, and is involved with activities at the Seminary.

A. Gregory McClure, after leaving St. John's, graduated from Johns Hopkins, received his M.D. degree from the University of Pittsburgh in 1972, and is currently in residency in internal medicine at Lankenau Hospital in Philadelphia.

Harold M. Morgan, Jr. (SF) is working on an M.B.A. degree at the University of New Mexico, has done some free-lance photography, some political work, and, unsuccessfully, attempted to organize a local-level business publication for northern New Mexico.

1969

Harold O. Koenig supplements our July report of his marriage with the news that he has completed a year as Chaplain Resident at the Massachusetts General Hospital in Boston, and is back for his final year at Virginia Theological Seminary in Alexandria, Va. Harry reports he wears his bachelor's hood proudly when he preaches.

1970

An Alumni Communicard encapsulates the career of *Lee Margulis* these past few years: "Was in successive order a high school teacher, private detective, insurance adjuster, student of film, novelist, shoe salesman, handyman; picked up M.A. in advertising (Syracuse University); radio salesman and copywriter, space salesman (*Village Voice*), M.B.A. candidate (Long Island University), and currently a media planner at Young & Rubicam, Int."

Dwight S. Platt is a partner in a national consulting service called MOPAC, a transactional analysist, and on the graduate faculty at St. Mary's Seminary in Baltimore. He and Susan have two sons, Charles, 5, and Sage, 2.

Sue (Dame) Skibbins (SF) writes that she and David are divorced; she works in the law library at the University of California at Berkeley and hoped to enter a program this fall in Human Development at California State at Hayward. She also studies graphoanalysis, is writing music, and auctioneering in the Santa Cruz area.

1971

Roger N. Dunaway (SF) studied classics after leaving Santa Fe in 1969. He then enlisted in the Army Security Agency, studied Mandarin Chinese for 18 months in Monterey, Cal., and had a tour of duty on the island of Honshu, Japan, at Misawa Air Base. Since his discharge he has returned to the University of

Oklahoma, where he is working on his M.A. degree in classics and teaching Latin. He hopes to complete his degree work in the spring.

Jeffrey C. "Cole" Kitchen received his Ph.D. degree in mathematical sciences from Johns Hopkins University in November.

Travis Lee Price III (SF) has designed the first Federally-funded solar energy system in a New York City apartment project. He holds an M.A. degree in architecture from the University of New Mexico.

"Graphics by Nostradamus" are really by *Barry N. Sher*, who has done a subway poster for the City of New York, Department of Air Resources, a book cover for the Real Estate Institute of New York University, and "lots of campaign literature."

1972

With a thesis about Walter Lippmann's theories on news and public opinion, *Philip Ansteth* earned an M.A. degree in journalism from the University of Missouri last August.

Charles Donahue is teaching at the Hyde School in Bath, Me.

Helen (Anastaplo) Scharbach graduated from the University of Chicago Law School in June, and is working downtown in Chicago for the firm of Mayer, Brown, and Platt.

We will attribute the following to *Irving H. L. Williams*, although the author is uncertain: "The Dow Street All-Stars, starring *Irving H. L. Williams* '72 and *Charley Brown* '74, regularly meet the Pine Street Punks, with *Steven Hanft* '70, *Jennifer Blaisdell* '73, and *Andy Reed* '73, for the soft-ball championship of the World. Our address is 15 Dow Street, Portland, Me., and we leave the door unlocked. Come and visit."

"What happened to the rest of the class?" asks *Nancy Willis*. She received an M.A. degree in psychology from the University of Chicago in 1973, then interrupted her studies to take a research fellowship at the Illinois Psychiatric Institute. Nancy is now a full-time consulting psychologist to the Illinois Drug Abuse Programs, enjoys her new sailboat, and takes pleasure in "not being in school for a while."

1973

Prudence Davis reports the expiration of her Watson Fellowship monies, which she used in part to complete a year-long course in tapestry weaving at West Dean College in Sussex, England. Prudence is now a postulant at Priory Regina Pacis, a Benedictine priory in London.

Jan Munroe is assistant manager at the Augusta, Me., outlet of Grossmans-Lumber & Building Materials Retail Stores. Says it's the last thing in the world she would have thought of doing, but life in Maine is very satisfying.

Mary Ridout (SF) reports a magna cum laude degree from Marlboro College in June 1974, a marriage to *Terry Applegate* (SF '74) in September of that year, a part-time job as a bookkeeper, and a full-time, one-year program in architectural technology. Terry works in his father's business while pursuing pre-med studies at Michigan State University.

Elizabeth Unger and *James Carlyle* were married last June in Wisconsin, spent the summer in Crystal City, Texas, where Elizabeth clerked for the county judge, and are now back in Cambridge, Mass. Jim is a "middler" at Episcopal Divinity School (on exchange from Nashotah House in Wisconsin) and Elizabeth is a second-year law student at Northeastern University.

Vanessa Lynn van Manen and Charles Frederick Gartrell were married last May. Until then, she had been employed as an analyst with Computer Science Corporation in Silver Spring, Md., working on projcts with NASA's Goddard Space Flight Center. Her husband is also an analyst with the company, as well as a graduate student at the Johns Hopkins Applied Physics Laboratory.

Lee H. Soloman represented St. John's at the inauguration of Margaret Waggoner as president of Wilson College, Chambersburg, Pa., on 27 September.

1974

Jon H. Hunner (SF) is currently working at the Commodities Exchange in Chicago. He travelled to New Mexico last summer to do a clown act at the Tierra Amarilla rodeo.

1975

A September note from *Jim Jarvis* says he is enrolled in medical school at the University of Vermont, where he earlier spent one undergraduate year, but finds the weather difficult to become re-acclimated to: snow already in the mountains!

Nancy Polk and *Christopher King* were married on the Saturday after graduation in the backyard of her parents' home in Glen Cove, N. Y. *Jim Tourtelott* '73, *Paul Fishleder* '72, *Jim Jarvis*, *Arthur Kungle* '67, *Charley Allen*, *Rick Plaut* '77, *Terry Schuld* '78, and *G. K. Bishop* were all there. Nancy now works as a copy editor for the Waverly Press-Williams & Wilkins Co., in Baltimore, while Chris drives an asphalt tank truck for the Lansdell Corporation of Maryland.

Annette Tullier is living in Thibodaux, La., where she teaches science to 4th, 5th, 6th and 7th graders. "It is quite a job," to quote her letter.

Bob Tzudiker writes that he and *Seth Ginsburg* share an apartment "in the heart of beautiful downtown Lower East Side New York." Bob is a working actor at the Jean Cocteau Repertory at 330 Bowery, and opened recently in *Twelfth Night*, cast as Sir Andrew Aguecheek.

Graduate Institute Notes

1970

Director of the 1975 High School Workshop was *Wendy Gray* of Santa Fe.

1971

From Lutherville, Md., comes news of *Bela Kissh*, who spent the summers of 1973 and 1974 in Hungary and other parts of Europe completing research for his Ph.D. dissertation.

1972

Beverly (Ross) Smith, having returned from a year as a television writer in Rock Island, Ill., another year as a teacher in Gallina, N. Mex., and still another year as a bookstore proprietor in Santa Fe, is now the Graduate Institute's registrar.

1973

Both *Jim* and *Alice Farley* are teaching in Gallina, N.Mex.

1974

Paul Bitting became a married man soon after the completion of the 1975 Institute, during which he served as a staff member of the High School Workshop.

Joe Pluchinotta is directing a child-care center and teaching part time in Albuquerque, N.Mex.

Continuing Students

Bob McMahan is a classical accordionist. His playing of "Toccata for Accordion" appears on a recent record album of music by Ernst Krenek. This record is available for $2.00 from Orion Master Recordings, Inc., 5840 Busch Drive, Malibu, Cal. 90265. Bob's wife *Anne* is also a student at the Institute. She is the sister of *Irving Williams* '72.

In 1974, *W. Laird Durley* applied for admittance to both the Graduate Institute and the undergraduate program in Santa Fe. He has now completed two summers in the Institute and is also a sophomore at Santa Fe. During a recent visit to Annapolis, Laird said he enjoys both programs and finds them complementary.

In Memoriam

1900—Peter B. Belches, St. Louis, Mo., July 9, 1975.

1916—John A. Worthington, Ruxton, Md., October 11, 1975.

1920—John M. Dawes, Annapolis, Md., October 7, 1975.

1922—Lyttleton L. Gray, Huntingtown, Md., September 15, 1975.

1932—Hugh F. Parker, Jr., Baltimore, Md., October 28, 1975.

1951—Thomas Jefferson Hamilton, Crystal River, Fla., October 27, 1975.

Faculty—Professor Vertrees J. Wyckoff, Claremont, Cal., November 13, 1975 (1924-39).

Nominations for the Board of Visitors and Governors

For the second year, the Alumni Association is grateful to *The College* for aiding in the annual election of two alumni representatives to the Board of Visitors and Governors. I hope that all alumni will want to cast their ballots in this election.

The directors of the Association have nominated four candidates this year for the two vacancies which will be created in the spring as *Julius Rosenberg* and *Thomas Stern* reach the end of their three-year terms. Both alumni are eligible for reelection, and have been re-nominated.

Two additional candidates have been named, *Stephen Benedict* and *Sharon Bishop*. Biographical data on all four nominees are listed in the column to the right. (There were no nominations by petition this year.)

Provided below is a tear-off ballot for your convenience in voting. *The By-Laws provide that a ballot be cast for two nominees in order to be valid.* Please fill in and mail your ballot NOW, if possible; in any event, in time to reach the Alumni Office in Annapolis no *later than 15 March.* (If you wish to copy the ballot, in order to avoid cutting the magazine, please be sure also to copy the reverse, including the mailing label; this serves as a validation of the ballot. Husbands and wives should cast two votes on one ballot by noting thereon that it is a double ballot.)

William W. Simmons
President
Alumni Association

The Nominees

Stephen Benedict, a 1947 graduate, is director of the Project in the Arts of the Council on Foundations. After college he worked for the Committee to Frame a World Constitution and the Foundation for World Government, then studied in Europe. He was a member of the Eisenhower White House staff, spent several years with the U. S. Information Agency, and, before assuming his present position, was for fifteen years on the staff of the Rockefeller Brothers Fund. He is unmarried and lives in New York City.

Sharon L. Bishop, a member of the class of 1965, received her degree from St. John's in 1966. She worked as a social worker and received a M.S.S. degree from Bryn Mawr College Graduate School of Social Work and Social Research in 1970. Ms. Bishop joined the management consulting firm of Booz, Allen and Hamilton in 1972, and is currently a senior Associate in the Institutional and Public Management Division. She lives in Reston, Va.

Julius Rosenberg, a graduate of the College in the class of 1938, is a staff member of the Associated Jewish Charities and Welfare Fund in Baltimore, Md. From 1968-1971 he was director of development in Annapolis. He served as treasurer of the Alumni Association from 1965 to 1967, and as its president in 1967-68. He and his wife Pearl live in Annapolis.

Thomas E. Stern is a member of the first class to graduate from the Santa Fe campus, the class of 1968. He studied film and economics at Stanford University after graduation, and in 1971 received an M.A. degree. He is currently involved in films for television, both regular programs and documentaries, with special emphasis on lighting direction. He and his wife, Nora (Gallagher) SF70, make their home in New York City.

DETACH HERE

OFFICIAL BALLOT

I hereby cast my ballot for the two candidates indicated (a vote for two candidates is required to validate ballot):

Detach and mail to: Alumni Office
St. John's College
Annapolis, Md. 21404

Alumni Representatives, Board of Visitors and Governors

Stephen Benedict '47_____

Sharon L. Bishop '65_____

Julius Rosenberg '38_____

Thomas E. Stern SF68_____

ALUMNI SUMMER PROGRAMS

Summer programs for alumni will be held again this year on both campuses. The Annapolis session will take place June 13-26, that in Santa Fe August 1-14. Complete information on tutors, readings, and administrative details will be sent to all alumni no later than March 15. Meanwhile, mark your calendars and plan to attend at least one session.

These programs are open to all alumni and their spouses, including, of course, graduates of the Graduate Institute, plus former students of the Institute.

PLEASE

It would be most helpful, and would save St. John's considerable money in the long haul, if you would let us know about an address change *before* it happens. And that would also help assure prompt, uninterrupted delivery of *The College* to you, as well as making life a bit easier for those who keep the mailing list for us. Your local Post Office can supply you with cards designed for address changes, or you can let us know in any way you wish. By whatever means, please do take a moment to notify us of your impending move. We will be most appreciative.

T. P. Jr.

Public Notice

In compliance with the Family Education Rights and Privacy Act, St. John's College retains the right to publish at its discretion the following categories of information with respect to each student *presently or previously attending the College:* the student's name, address, telephone listing, date and place of birth, field of study, participation in officially recognized activities and sports, dates of attendance, degrees and awards received, and the most recent previous educational agency or institution attended by the student. Students have a right to inform the College within a reasonable period of time that any or all of this so-called "directory information" should not be released without their prior consent. Requests by students to suppress from public distribution the above-mentioned information are to be made annually. As required by the Act, St. John's College will provide public notice annually of its intention to publish such information.

The College
St. John's College
Annapolis, Maryland 21404

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