

The University of Michigan  
Midyear Graduation Exercises

Address to the Graduating Class  
INTERNATIONAL ADVENTURE IN LEARNING  
by Sydney Chapman

2 p.m. Saturday, January 16, 1960

Hill Auditorium

## INTERNATIONAL ADVENTURE IN LEARNING

by Sydney Chapman

Dear Fellow-Graduands,

This venerable and distinguished University is about to bestow upon us the seal of its testimony that we are persons of some learning--an occasion happy for us. We shall become members of a more than century long succession of alumni, who in Ann Arbor have drunk of the fountains of knowledge.

Drinking is a pleasant occupation, fortunately not confined to university students, nor even to the human race. Drinking, eating, the exercise of our bodies, reproduction, are things we share with all living creation. But in learning, mankind is outstanding, not altogether in kind, but unquestionably in degree. As babies we progress with astonishing rapidity. According to Samuel Butler we are then awakening unconscious memories, the fruit of the learning of our forebears through countless generations. And when we learn to read, we become able to enter the almost incredibly vast storehouse of past learning--part of the collective conscious memory of mankind.

Many members of the human race have little opportunity to explore this treasury, rich with the spoils of time. We have been more fortunate, living and studying in this city of libraries, museums, and, most important, in the midst of a great company of teachers and leaders distinguished for their ability and learning.

Our libraries garner the wisdom and knowledge of many centuries and many lands. Our learning has been drawn not only from national, but from international sources. He or she who discovers or creates some new thing in the field of learning typically seeks to make it universally known. Across barriers of language and politics and religion, we gladly accept truth and beauty in thought and expression, and new light on Nature.

In former centuries many poor scholars journeyed from one medieval European university to another, when Latin was the common language of learning. They sat at the feet of the great scholars of the day, and some could impart as well as receive. One asset of this University of Michigan, notable for the number of its students and teachers who come from other lands, is the opportunity we have for international interchange of experience and learning. It is a solvent of hampering prejudices, bigotry and intolerance.

What may now be expected of us who, as this university will testify, have gained some learning? Are we to rest on our oars, and only practice and impart what we have learned? For some this may be so, but assuredly only for few. Have not most of us caught a spark of the divine fire, the love of learning? Shall we not try to do our part in increasing the heritage of knowledge and understanding available for our successors? Our life and our learning will progress together; may the time in our lives be far distant when curiosity and the eagerness to know and learn will slacken. Let us aim to progress not only in our individual techniques and specialisms but also in understanding of the national and world society in which we live. It is not so long since it was thought, in this and other lands, that some women were witches and should be burnt to death. If we prove all things, as the apostle Paul enjoined, we may find we still have cruel bigotries and practices that our society needs to abandon. Do not shrink from hearing dissident and unpopular voices, but weigh well what they say.

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It is today a platitude that the progress of science and techniques has made of this earth "One World," as Wendell Willkie said. We need to be conscious of our community with men in all lands, to cooperate with them in the pursuit of common goals, rather than stress our differences and divisions. How many diseases, pests, ignorances and weaknesses, prevalent the world over, we need to overcome. How much there is to learn about Nature, that will benefit us all by knowing.

Amidst the depressing features of the international politics of our time, the very recent past has to its credit an outstanding example of cooperation, in what may truly be called an international adventure in learning. It was the great enterprise of scientific observation and research known as the International Geophysical Year, commonly abbreviated to IGY. Its object was simple---to learn more about the earth, and about the sun, our giver of light and heat, that influences the earth in so many ways.

We know how various are the different parts of the earth, from the icy arctic seas and antarctic highlands to the lush tropics or the barren deserts or the fertile populous lands. We know the vagaries of climate, that may bring fruitfulness or prosperity to one country, and disastrous floods or drought to others. We know how volcanoes may dangerously erupt, how earthquakes may bring destruction, fire and terror to cities. But we are far from understanding these things. The world is almost fully explored geographically, but of deeper knowledge much is still to seek. That search was the object of the IGY. The vast and complex earth cannot be understood from observation and research in one country alone. It must be studied in all its parts---a tremendous task, that stretches the capacity of the whole human race. Thus the IGY claimed the efforts of all nations. At one time it seemed that the governments of almost all mankind would promote such effort. Actually those of the great majority, four-fifths, did so. Sixty-six nations cooperated in the IGY. From both sides of the sad political barrier that separates the east and the west, men and women joined in hearty good will to plan the work and to execute the plans. Political hindrances to the meeting of the earth scientists and solar astronomers from east and west were relaxed; the mail flowed more freely in both directions. It became safe for an American scientist to be known to be cooperating and coresponding with a Russian or Chinese scientist, and vice versa. It was immaterial to our cooperation whether in their own communities they were political conformists, or open or secret dissidents. They shared, and felt that they shared, the same scientific attitude and objectives. They too were baffled by the same problems of Nature, and were eager and hopeful to solve them. They wanted to learn, they knew they needed cooperation in their learning, and they respected and valued each others' aid.

In the small early international meetings called to plan the enterprise there was a wonderful spirit of enthusiasm for the coming venture. In their several countries the scientists were able to impart some of this enthusiasm to their academies and other institutions---of whose members, naturally, the greater part were engaged in fields other than the study of the earth and sun. Through the academies the earth scientists and solar physicists succeeded also in arousing enthusiasm for the IGY in the national governments and legislatures, who could and did provide the money needed for the work. The basic idea of the IGY was simple, direct and appealing. The press also caught the enthusiasm, and the publicity they gave to the IGY stimulated the imagination and interest of millions the world over---young and old, schoolboys and schoolgirls, studious or adventurous young men, housewives, old people. Not only the earth scientists, but the whole community, drew inspiration from the great enterprise. Moreover, though the IGY called for the most advanced techniques in many directions, it was also possible for a schoolboy or a housewife who wished to do so, to make some modest useful contribution to the work---as by watching the sky for the auroras or the satellites.

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Enthusiasm can do much for an enterprise--of course some men are much more capable of it than others. But hard steady work is what brings the results. Internationally at the central planning meetings, and still more in their home countries working out the national programs, the scientists buckled down to their tasks. They were happy in the spirit of cooperation shown by their fellows in other lands, which brought valuable interchange of ideas and practical help. The scope of the enterprise widened greatly as the planning proceeded. Four years after the IGY was first mooted, and three years before it was to begin, a young American scientist, Singer, of the University of Maryland, proposed that earth satellites should be included in the program. His proposal was adopted, in hope mingled with doubts. You all know that the doubts were dispelled, the hopes confirmed, by the launching of the earth satellites by the USSR and USA.

Gradually the IGY will recede into the past, and its harvest of knowledge and understanding will be merged in the general text of many books on the earth and the sun. But historians may still recall that the IGY gave the inspiration for this epoch-making first step in the exploration of space, and led to the provision of the necessary large funds.

Exciting discoveries have come, as you all know, from the satellites and the far-ranging space rockets. Like Saturn the earth is found to have large external appendages, the Van Allen belts. They are different from Saturn's rings, but equally definite and interesting in structure. The back of the moon has been photographed. These are a foretaste of many discoveries to come, when man ranges farther afield, in the solar system and perhaps beyond.

But with the IGY just over one year behind us, we are only at the beginning of its harvest. To change the simile to one still more homely, we are like cows that have fed on rich pasture. Some specially tasty bits have already been savored, but the cud-chewing has only just begun. To revert to the former metaphor, whereas much time had to be spent on the sowing and ploughing, so also much time and hard work must go to the reaping, the ingathering of the harvest. This task too will be lightened by the same enthusiasm for learning that marked the earlier stages of the IGY.

Apart from its direct fruits of knowledge and understanding of our planet and the sun, there are others less direct. Barriers have been cleared away, a sense of unity has been engendered among many scientists the world over, joined as they have been in a quest ardently followed. The eyes of governments, legislators and the peoples have witnessed an object lesson in cooperation in wholly beneficial tasks. Here also is a highly worthwhile outcome of this great international adventure in learning.

Moreover the benefit has been extended into the political sphere. Hearty cooperation was shown among the many national scientific expeditions that shared the dangers and discoveries on the Antarctic continent. Common plans were developed for weather prediction and mutual aid--plans executed at a center internationally manned. During the past year the nations that took part in this effort have conferred under the auspices of the United Nations Organization, and have agreed that the Antarctic continent shall be kept clear of military installations--a small but significant step towards a more united world.

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Steps in right directions make later steps in those directions easier and more likely. As regards the study of our planet, the effort of organized observation and research has necessarily relaxed somewhat, after the great IGY period of specially intensive effort and financial provision. But it remains at a permanently higher level than before. Geophysical learning, and the rate of learning, have been enhanced. And in 15 to 25 years' time there is likely to be a renewal of such a special effort--with many problems and many techniques not yet dreamt of.

Other fields of learning of universal importance to mankind may come to be cultivated in the same internationally cooperative way, though simultaneous coordinated study therein may not be so intrinsically necessary as in the study of our planet. There is an International Refugee Year, and suggestions have been made, for example, for an International Medical Year. Extended cooperation between the nations in non-political fields should lead to better understanding between peoples, create a better international atmosphere, and thus ease the solution of political problems.

I have mentioned that a young scientist, Singer, inspired the inclusion in the IGY program of its most novel element, the launching of satellites for research into the conditions in space around the earth. This was a notable example of what is one of the happiest features of the search for knowledge and understanding. It is a quest in which age has little relevance. Young and old cooperated in the IGY, and will cooperate in the study of the observations. Each will impart to the other, in mutual respect. Where opinions differ, decisions, when they can be reached, will rest on evidence and argument. Seniority and rank in themselves carry no conclusive authority.

The poet Alexander Pope, in his famous Essay on Criticism, wrote:

A little learning is a dangerous thing,  
 Drink deep, or taste not the Pierian spring.

Perhaps the danger he had most in mind is that of self-satisfaction in our possession of learning. The most learned among us is the best able to realize that indeed all we can aspire to is but a little learning.

Of course learning has other aspects than the cooperative one that I have been stressing. It has its emulative, sometimes its fiercely competitive aspects. Some men feel in this way, even when their efforts are directed to pure knowledge, with no thought of technical applications and financial rewards. The odium scientificum can rival the odium theologicum. To temper this intensity of personal feeling we need more learning; we need to learn that those deeply interested in the same problems as ourselves are colleagues and cooperators, even in controversy. Perhaps it is relevant to remind you of an example of this wise understanding shown in a political situation. The leading party in the British House of Commons forms Her Majesty's Government. The losing party--which may have the support of almost as many citizens--criticizes the Government's actions. It is recognized that such criticism renders a service to the nation. This recognition takes two forms. The opposition party in the House is called Her Majesty's Opposition; and its leader receives a special salary from the State for his services. Pope, in the poem I have already quoted, expresses the same idea thus:

Trust not yourself; but your defects to know,  
 Make use of every friend--and every foe.

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In politics, as in war and in business, men show the fighting instincts that we share with the animal creations. But in our powers of cooperation, as in our powers of learning, we far surpass our fellow living creatures. Moreover we can consciously look at ourselves and see our imperfections. We can strive and learn to lessen them. This striving, this learning, can be lifelong for each one of us. For mankind as a whole, it can continue from generation to generation. Looking back to man's past, what development we see. We cannot probe the future, but humanly speaking we can rest our greatest hopes in this international, this universal adventure in learning.

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