

TEACHING ANTHROPOLOGY

Teaching Anthropology Newsletter

In recent years precollege anthropology has been taught more and more often and in more and more places. Anthropology is now part of many history, science and social studies curricula.

Teaching Anthropology Newsletter (TAN) promotes precollege anthropology by: providing curriculum information to teachers; creating a forum for teachers to exchange ideas; and establishing communication between teachers and professors of anthropology.

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Teaching Anthropology Newsletter

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NEWSLETTER

**Nova Scotia Archaeology
Society Publications**

The Nova Scotia Archaeology Society (NSAS) was established in 1987 to promote cooperation among professional and amateur archaeologists in the Province. In February, 1988, with the assistance of the Nova Scotia Museum, it launched the first issue of its **Newsletter**. The **NSAS Newsletter** will publish reports on Society activities as well as book reviews, debates and announcements of artifact discoveries. **TAN** readers with contributions should send them to Editor Charles Lindsay, c/o Environment Canada-Parks, 2nd Floor Red Store, Historic Properties, Upper Water Street, Halifax, NS B3J 1S9.

The Society has also bound and is distributing Nova Scotia Museum Curatorial Report 61, **The Late Prehistory of Nova Scotia as Viewed from the Brown Site** by Helen Sheldon (1988). In this Report Sheldon uses current archaeological and ethnohistorical evidence to address questions about relationships among prehistoric and ethnohistoric peoples, including the Micmac, in Nova Scotia and other Maritime Provinces. She also discusses seasonal subsistence and artifact procurement strategies throughout the region. The Report can be obtained by sending a cheque or money order for \$8 (\$5 for Society members) plus \$2 for mailing to the Nova Scotia Archaeology Society, c/o Nova Scotia Museum, 1747 Summer Street, Halifax, NS B3H 3A6.



**High School Anthropology Study
To Be Published**

In 1988, the Saint Mary's University **Occasional Papers in Anthropology (OPA)** series will publish **Methodology in Precollegiate Anthropology: A Secondary School Approach** by James Russel Stephens.

Stephens tells the recent history of anthropology at a multiracial high school in suburban Miami, Florida. He describes how and why the course was introduced, addresses its impact and gives practical advice about course content, curriculum aids and teacher training in anthropology.

TAN readers who want to be notified when the study becomes available can send their name and address to Roberta Wittmann, **OPA** Circulation Manager, Department of Anthropology, Saint Mary's University, Halifax, NS B3H 3C3.



Even Older Than Granny?
**The Present State Of The Teaching Of
 The Past To Children Of 8-12 Years
 In Britain***

by Peter G. Stone

[TAN readers who want to learn more about precollege archaeology in the United States should consult **Anthro Notes'** recent special issue on archaeology and the high school (Vol. 10, no. 1 winter 1988). To obtain a copy write to Ann Kaup, Department of Anthropology, Stop 112, Smithsonian Institution, Washington, D.C. 20560 U.S.A. -- Ed.]

Abstract

Archaeology and prehistory are rarely taught to any depth in British primary schools. Passing reference is often made to cavemen and the "great civilisations" of Egypt, Greece, and Rome. It is argued that archaeological data fits and enhances the enquiry approach favoured in many primary schools and that its use would greatly benefit both archaeology and education.

The Educational Context

Pre-university education in Britain can be crudely divided into primary and secondary schooling, with children passing from one to the other between 11 and 13 years. In primary education there is, in theory at least, a strong interdisciplinary philosophy almost entirely free of the external examination system that dominates the secondary school. Such an approach

*Modified pre-circulated paper in **Archaeological Objectivity in Interpretation**, World Archaeological Congress 1986, Vol. 3 (mimic). Thanks to Bob MaKenzie, Phil Planel and Peter Ucko for reading and commenting on earlier drafts of this paper. All mistakes and conclusions are mine alone.

(again in theory) frees the children to learn, and therefore develop, through personal discovery and experimentation.

This primary school philosophy blossomed during the 1960s. Many teachers and teacher trainers found inspiration concerning this approach from the writings of the "fringe" educationalists of the time who were putting into practice many ideas that were being tested in both the private and state systems that run alongside each other in Britain (eg. Neil 1962).

This philosophy found its "establishment" justification in a number of British and European Education Reports in the 1960s and 1970s (eg. Thomas and Majault 1963; Plowden 1968; Her Majesty's Inspectorate [hereinafter HMI] 1978).

The same philosophy is still central in today's primary school:

They (teachers) must choose those parts of the knowledge of the world that they would best help the pupils find their places in it and understand it. "They will not understand it yet", they said "but we will sow the seeds from which in the fullness of time, understanding will grow. Each experience will be real and true, not secondhand and doubtful. Personal response to exciting stimuli will be sought. The pupils will be exposed to primary evidence and learn to sort and sift, include and reject hypotheses and test their theories. They will learn to correlate evidence from several sources and to question (Richardson in press)."

In 1974, the Schools Council supported a survey on "The Aims of Primary Education." In one section of the survey a cross-section of teachers were asked "What, in your opinion, are the aims of primary education."

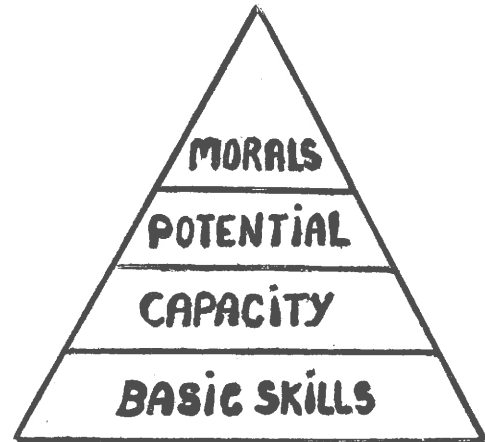
From the replies four fundamental fields came to light:

1. To develop the basic skills and build up knowledge.
2. To develop the child's capacity to think.
3. To develop the full potential of the individual child in all aspects.
4. To foster the children's moral and social development (Davies and Ashton 1975).

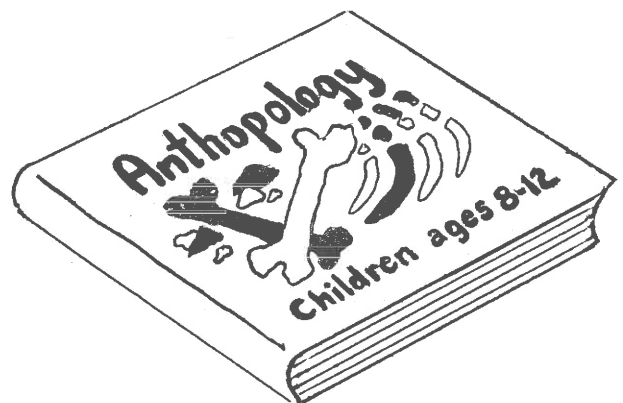
It is not clear that all primary schools in Britain follow such an "enlightened" approach. There are still many schools where far more traditional text-book based approaches are followed (see HMI 1978:73). It is argued, however, that those primary schools which are seen to be at the forefront of the development of educational practice are those that follow a "learn by experience and involvement" philosophy (Hampshire County Council n.d.; Inner London Education Authority 1982).

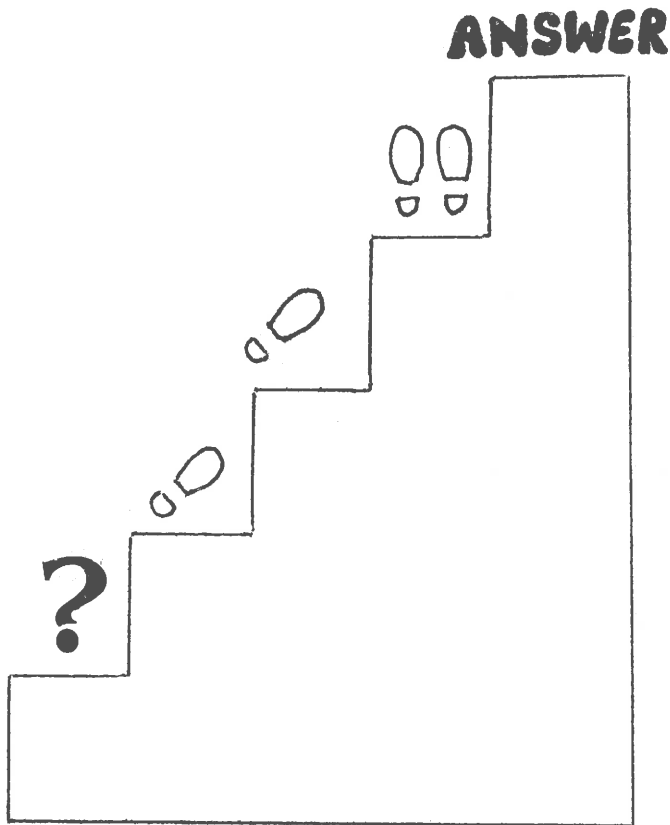
What is clear is that the vast majority of primary schools and education authorities still base much of their understanding of children's development on the clearly defined sequential development outline by (amongst others) Jean Piaget (see, eg. Piaget 1953; and for a discussion of his ideas see, eg., Boyle 1969 and Wadsworth 1978). Clear examples of the acceptance of this sequence can be seen in a number of the recently published County guidelines for primary schools subject areas (see, eg., Cleveland County Council 1981:9; Hereford and Worcester County Council n.d.:8; and Hertfordshire County Council 1979:12 & 13).

Two points need to be noted. Firstly, that within the age bands identified by Piaget children can, and do, develop at different rates; this does not alter Piaget's overall argument for sequential development, rather it adds to the understanding of



the different phases for individuals. Piaget was concerned with the "general human mind" not individual development (Ginsburg 1981:326). Secondly, it is now argued that the stages are not "as clearly defined or sharply distinguished as the steps of a staircase (Karplus 1981:287)." Karplus refers to work (Flavell 1971) that shows that each stage develops gradually and that some, for example, formal operational skills (where children develop the capacity for abstract thought) may develop earlier than others (Karplus 1981:285). Children at the Concrete Operational stage (where they are still bound by their own experience) will be beginning to develop some skills that are classified by Piaget as Formal Operational. They need to move from the known (Concrete) to the unknown (to them abstract and technically formal operational) and Coltham argues that it is part of the teachers' role to stimulate this skill and development (Coltham 1971:15-16 and 32, 42).





The Role of the Past in the Primary School Curriculum

One of the fundamental ideas behind primary education as outlined above is that the different academic disciplines are rarely, if ever, taught separately (see, eg., Inner London Education Authority 1982; Gardner n.d.). This said, of the 542 schools studied by the HMI in their 1978 survey, about 75% were seen to do some sort of history (for present purposes "history" as defined in primary education can be seen to be synonymous with "the past"). Not one of these schools had a history specialist on the staff whereas 70% of them had a music specialist, 48% had a game specialist, and 13% had a dance specialist. It is only when the theory and practice of primary education come together that a history specialist will be seen not as an unnecessary or indulgent luxury but rather as someone who can introduce

and develop broad based projects, incorporating a variety of disciplines through the study of the past. When, and if, this unique potential is realised, the history specialist will become as common as his or her counterpart in music, who is already perceived as a "resource" useful to a wide range of other teachers and subjects. Thirty-six percent of the schools did have some written guidelines for history, either prepared by the school or by the Local Education Authority. This last figure would probably be much higher today (Batho 1985).

Most of the guidelines strongly advocate a developmental, experimental and personal discovery method of teaching (see, eg., Cleveland County Council 1981). Many also underline the value of a topic approach (eg. Hertfordshire County Council 1979:1; Essex County Council 1983:1). With specific reference to the teaching of the past many emphasise the need to give children a "context and perspective for later life (Avon County Council 1982:9)." Often seen to be strongly linked with this is a need for an empathetic relationship with the past (see, eg., Hertfordshire County Council 1979:2). This relationship is clearly defined in the 1985 HMI report on the teaching of history. "Historical empathy is the ability to enter into some informed appreciation of the predicaments or points of view of other people in the past It can often be encouraged by discussion, simulations, role-playing and drama strategies often found in the best of primary practice (HMI:1985:3)."

Given this strategy, it does not seem to matter what period or event in history is studied so long as a series of objectives concerning the children's development, usually related to concrete skills, are achieved (see, eg., Hertsford County Council 1979:2-3; Cleveland County Council 1981:3-6; HMI 1985:2-5). It

is, however, noticeable that in many of the recent County guidelines "the past" begins in earnest with the Romans, with only a brief and cursory glance taken at prehistory (eg. Cleveland County Council 1981:12; Hereford and Worcester; n.d.)

The Distant Past in the Primary School: Availability of Resources and Teacher Training

One problem with archaeology and prehistory as taught in the primary school is that archaeologists have been extremely lax in disseminating their knowledge - in a usable manner - to the non-specialist public. Teachers cannot teach if they do not know about a subject or if there are no useful, up to date, easily accessible texts. Compounding this problem further, archaeology, as a discipline in its own right, is not taught in any teacher training colleges in Britain. It is difficult (although not totally impossible) for archaeology graduates to obtain places in post-graduate teacher training courses because of Government guidelines on the relevance and suitability of the applicant's first degree. The combination of such guidelines and lack of relevant courses, combined with the predominately disinterested approach of archaeologists, create a barrier, of immense proportion, to the introduction of teaching about the distant past. Some archaeologists have been trying to break down the specifically educational divide for a number of years (eg Branigan:n.d.) but it is only recently that the archaeological establishment as a whole has begun to see the need, and value, of such interactions.

This new awareness has resulted in a number of explicit policy statements emphasising the importance of the educational potential both for archaeology and of archaeological data in Britain and Europe (Prehistoric Society 1984; Montagu; Council of Europe 1985). Such statements have

made it considerably easier to argue for, and carry out, archaeologically related education projects.

Primary School Survey

To ascertain the present state of archaeological teaching and awareness in primary schools, and in an attempt to gauge the potential response if advice and help were offered, a questionnaire was circulated to primary schools in Hampshire. Two hundred and forty-one schools replied out of a possible 369 (65.3%). Most of the questionnaires were completed by headteachers.

Only 23% of the schools that replied used archaeology in their teaching on any regular basis. From remarks made in the questionnaires and in follow up discussions with some of the schools, it appears that this usually only took the form of a mention at the start of a history topic. Only 1.2% (3 schools) had seen the CBA handbook for teachers (Corbishley 1983) and only 2.1% (12 schools) had seen the booklets on archaeology also prepared by the CBA (ref. Corbishley 1982a&b; Croft 1982; Dale 1982; Steane 1982). Equally dramatically, only 8.3% (20 schools) and 7.9% (19 schools) had even heard of the respective publications.

However, when asked if they could see archaeology being used as an approach to broaden the syllabus, 73% (176 schools) replied in the affirmative; 70.9% (171 schools) wanted visits by archaeologists to speak to the children (so long as they could speak at the right level) and 81.7% (197 schools) wanted to borrow artifacts or replicas after such visits; 48.1% (116) said they would welcome day or half-day courses to introduce teachers to archaeology, and 60.9% (147) said they would welcome one-off lectures for teachers by archaeologists.

An Archaeology Project for
Primary Schools

Given the above outline, a project was devised to attempt to take archaeology and prehistory into the primary curriculum. The original project has been described elsewhere (Richardson in press) as have some of the later organisational details and initial reactions to a somewhat developed project (Stone 1986a). It has formed part of the work of a team especially brought together in the Department of Archaeology, University of Southampton, that is trying to bridge the gap between archaeology and schools. The team has 4 overall objectives that are incorporated into all of its projects.

1. To demonstrate that there is evidence of the past in the physical environment everywhere around us.
2. To show that this physical evidence of the past is under continual threat from ever-present and ever-changing human interaction with the environment.
3. To integrate this unique category of evidence into the study of our past into local schools.
4. To develop material that is in keeping with the "enquiry" based curricula now favoured in many schools.

The period chosen for the study is c. 5000 years ago when society in Britain was in the early stages of sedentary farming. There are two major reasons for this choice. Firstly, it is probably the earliest period in (pre)history to which children can be expected to relate with some degree of "ease". The huge leap in understanding and imagination that would be necessary for most British children to study a mobile



hunter gatherer society would entail such a loss of empathy (through ignorance and inability to grasp concepts) that much of the value of the project would also be lost. A major link, that allows an empathetic relationship to develop, is that both the children, and those they are studying, live, and lived, in one place. It is argued that this link is a probable subconscious "hook" for the children. Without such a "hook" the project would probably be far more difficult. Secondly, it is a period that has left a wide range and substantial number of physical remains, of varying degrees of visibility, close to Southampton.

The children are taught through a variety of methodological approaches. Classroom teaching, visits to prehistoric monuments and a day of "experimental archaeology" all combine to present a picture of a past inhabited not by unintelligent "grunter groaners" but by a highly organised, intelligent and skillful society. The children are able to learn through their individual (and group) first-hand experiences both of real prehistoric monuments and artifacts, and of experimental constructions of skills available in prehistory.

At no point do the children pretend to be living in the past as has been attempted elsewhere (eg. Millar and Durston 1982; Cooper 1983; Bell 1984). They have lost too much and gained too much for such an approach to have any real educational value. Rather, it is the skills of the past, known or inferred from archaeological evidence, that form the basis of the children's understanding of, and empathetic relationship with, the past.

Results and Conclusions

1. Children's Understanding and Development

Children involved in the project have learnt a lot about the present state of knowledge concerning prehistory and the Avebury monuments in particular. For example a 82.2% (total sample) knew that West Kennet Long Barrow was a burial mound and all but one of the children ascribed the building of the Avebury monuments to the Neolithic. It is interesting to note that while nearly all of the children could place the Neolithic in a simple chronological sequence (coming before the Iron Age but after the Palaeolithic), only 65% of them could give it a definite temporal position. Initially this inability by 35% of the children to grasp that Avebury was built about 5000 years ago heightened many teachers' initial worries about teaching prehistory in the primary school. However, it is argued that for such children temporal distance has little to do with relative chronological understanding -- to them the First World War is just as remote as the Neolithic. The important point for children to grasp is chronological relationship -- after all, how many adults really understand what is meant by 5000 years ago?

More important than any measurable gain in factual knowledge, the children learnt about the use and interpretation of a number of different types of evidence. They were not fed stock responses of "the correct answer". They themselves had to learn by questioning, seeing, and experimenting. The long-term benefits and value of such work can only really be measured after a number of years. Many children, who have been through the project, have certainly used information, learnt during the project, in later school work (see, e.g., Richardson 1986).



Many have been provoked to think about the world they live in as a result of the work: When asked what advantages or disadvantages there were for people living in the Neolithic as opposed to today, a number of children talked (without prompting) of there being no pollution, it being more peaceful, and there being no nuclear threat. Most, however, said they would miss, in one form or another, the technological achievements and luxuries of today. Not surprisingly, 76% of children questioned said they would prefer to live in today's world. Whatever the answers, the crucial point is that all the children had been made to think about their answers rather than just repeat perceived knowledge from a given textbook. It could be argued that the children were repeating perceived knowledge received from those teaching them. This possibility cannot be ruled out totally. However, it must be stressed that the teaching technique was one of provoking questions rather than giving answers and that different conclusions arrived at by the children were always accepted so long as they were based on correct evidence. A number of children have even gone back to the Avebury monuments, taking with them parents who have never visited prehistoric monuments before.

However, the real strength of the project lies not in its own uniqueness, but in that it represents a type of teaching that the children are used to in many primary schools. The evidence approach is now common in schools and the project simply extends this approach to teaching by presenting a new data base for discussion and by increasing the number and range of staff involved. The fourth overall objective of the Archaeology and Education team is to show teachers that archaeology can fit into the present school curriculum. Many teachers have initially expressed concern that some parts of the project

are too difficult and too abstract for their children. However, in every school, by the end of the project, all the teachers have been fully convinced of the worth of introducing teaching about the distant past into their curricula.

2. Teachers' Reactions

Much of the teachers' initial concern stems from their own ignorance of the aims and techniques of modern archaeology. Once this ignorance has been partially overcome, teachers begin to see the potential worth of the subject. They begin to appreciate that the study of a prehistoric monument need not only develop historical skills (for example, writing, interpretation of evidence, and empathy) but can also encompass subject areas such as geography, mathematics, art, craft, and even philosophy and religious study. One of archaeology's great assets in the University sector is that it has the potential to be a bridge discipline linking not only different departments but also different faculties (see Stone 1986b). Once this asset has been understood by teachers, the demand, as already experienced here in Hampshire, will be great. The project has clearly shown the need for a study of the distant past to take its place in the curriculum of teacher training colleges throughout the country.

3. The Value of Introducing Archaeology into the Education System

The project also has great potential benefit for archaeology. A sound archaeological policy for the preservation of the physical remains of the past can only be implemented with the co-operation and understanding of a wide section of society. It has already been argued

elsewhere (Gregory 1983; Hodder 1984) that the increase in metal detecting is a direct result of archaeologists withholding information (the ulterior motive for which is irrelevant) from the general public. The success of the Jorvik Viking Centre in York has shown there to be at best, substantially untapped, public interest in the subject (Caldwell 1985; also see Stone 1986b). Taking a well argued and sympathetic view of the physical heritage into primary schools is a crucially important first step in the battle for such a policy.

If archaeologists are to make use of the potential of primary education, then they must take the initiative. Primary teachers are already heavily involved in a whole range of activities and, unless stimulated, are not going to go out looking for new work. Nor should the burden fall onto already overworked archaeologists. The Historic Buildings and Monuments Commission for England (HBMC) and other funding bodies should insist that an educational facet is incorporated into every major project that they fund. This should not simply be a written commitment of an ideal but, certainly for larger projects, should entail the employment of a qualified person to carry out the work. Obviously, the need for such personnel should stimulate the reintroduction of archaeology courses into teacher training colleges (that have died out as individual staff have moved on). These are two, basic, initiatives that the HBMC Education Section and Council for British Archaeology (CBA) Education Board and Schools Committee should be demanding at every possible moment.

The introduction of an educational dimension to archaeology projects would certainly begin to break down the barriers between archaeology and primary education. As shown above, once something is offered to primary teachers (and understood by them) it is taken up with tremendous enthusiasm

and commitment. The next stage, that is somewhat more difficult (although see Planel 1986), is the introduction of archaeology-based studies into the secondary sector. Once this has been achieved, archaeology at university should have a far healthier future (see Stone 1986b). With archaeology-based studies throughout the education system, the physical archaeological heritage should fare far better. The last point may seem to be a long term hope but in reality it must become a short term achievement if that heritage is to be saved. The introduction of archaeology-based studies into the primary school is the first step towards such an achievement.

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Subtle Creationist Influence on Ontario Science Curriculum

by J. Richard Wakefield

[Every precollege anthropology teacher is likely to be drawn into the controversial public debate between evolutionists and scientific creationists. A network of American State and Canadian Provincial Committees of Correspondence, sponsored by the National Center for Science Education, can help teachers keep up with the debate's leading edge. Richard J. Wakefield is head of the Committee of Correspondence for Ontario. In this article he describes what he sees as creationist inroads into science curricula in Ontario high schools.

TAN readers who want to learn more about Wakefield's views and the views of other pro-evolutionists can subscribe to the bimonthly **Creation/Evolution Newsletter** (\$7 annually in the U.S., \$8 elsewhere) or the trimonthly **Creation/Evolution Journal** (\$9 annually in the U.S., \$10 elsewhere). Subscription orders can be sent to the National Center for Science Education, Box 32, Concord College, Athens, WV 24712 USA. Another useful publication is **The Creation Evolution Bibliography & Directory**, 3rd. ed. (1987), a 200-page looseleaf list of almost 3,000 references. It can be ordered for \$30 from Ernie Lazar, 495 Ellis Street, #1753, San Francisco, CA 94102-1996 U.S.A.

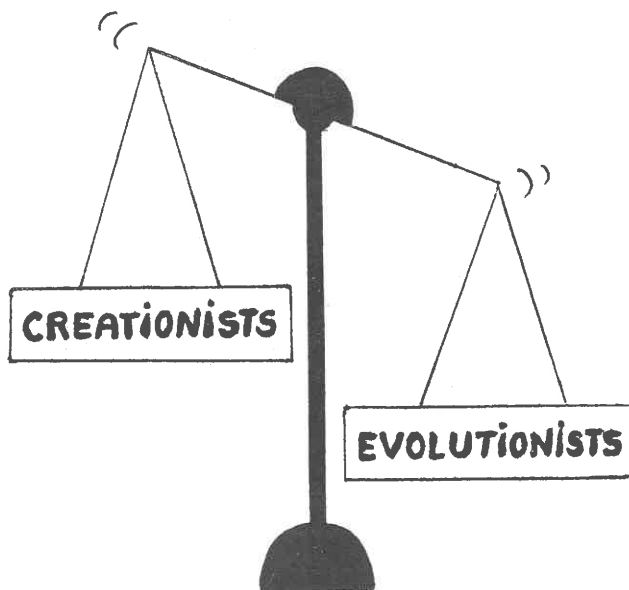
TAN always welcomes contributions about evolution and creation. -- Ed.]

Although the Ministry of Education denies it, the evidence seems clear enough in the Teaching Guidelines that creationist lobbying appears to have made headway in Ontario. The story originally broke in a **Globe and Mail**

article titled "In New Science Curriculum, Life Changes, Not Evolves." Technically, the title was incorrect, as the article dealt primarily with astronomy in a grade 12 physics course and had little to do with biology. Nevertheless, the article sent shivers down the spines of the scientific community by revealing the extent of creationists' involvement in setting up the Guidelines.

The article said that Jack Bell, then Guidelines manager, denied that creationists had influenced the Guidelines. However, the article noted that creationists "were among those groups who had been asked to comment on the new curriculum."

Although the Ministry denies this too (the Guidelines are free for anyone to pick up), one can see from the Guidelines and the editorial changes the Ministry has made to them that the Ministry does not want to upset the creationist fringe.



CREATIONISTS

EVOLUTIONISTS

Here are four examples of how the Ministry changed the Guidelines for the astronomy unit of the grade 12 physics course.

1. Original: ...dealing as it does with vast distances, time frames measured in billions of years, and mass-energy scales that dwarf terrestrial experiences....

Change: (underline removed)

2. Change: (the term "evolution" used 22 times for describing the processes of the universe was reduced to 10 times, and the word "developed" was substituted in the other 12 places.)

3. Original: ...explain the probable connection between a supernova explosion, nucleosynthesis, and the formation of new stars....

Change: (underline added)

4. Original: ...outline the details of the proton-proton chain of nuclear changes which are believed to occur within the sun...

Change: (underlined added)

There are other changes, but these four could be interpreted as creationist influence. The first change shows reluctance to state any determination of the age of the sun or universe. Obviously, this conflicts only with young-earth creationist views and there is no other reason for removing it. (In the final draft, the age has been restored.)

The third change shows the Ministry's intention to correct what it calls the misimpression that science is dogmatic -- just as dogmatic as creationism. The addition of "probable" would, according to the Ministry, remove dogma and restore its tentativeness.

The fourth change, it would appear, was made explicitly to please creationists. In the **Globe** article, the Vice-president of the Creation Science Association of Ontario, Alan Montgomery, said about the evolutionary view taught in schools: "We have no trouble with a statement that says 'most scientists currently believe...' This is just a statement about popularity of the opinion."

The Ministry sees creationism not as a scientific issue but how it could be an alternative, non scientific, perspective. This was spelled out in a disturbing paper released by the Ministry:

The aim of teaching as instruction is to enable the student to acquire some sophistication with regard to science as a discipline in relation to other disciplines. In this context, it is conceivable that issues such as creation be taught in a science classroom. But the reasons for doing so would be to compare scientific and religious ways of explaining phenomena. In other words, it would be a pedagogical vehicle for helping students to understand one world view by comparing it to another.

Science is **not** a world view, it is a process which allows nature to express itself to us. It is obvious that creationists have succeeded in convincing the Ministry that their view is legitimate. They claim that they are looking at the same data as evolutionists and merely coming to a different logical conclusion. However, this is not the case. Creationism is based on fraud. Literature promoting "creation science" is loaded with misquotations, out-of-context quotations, bad scientific practices, and knocked down straw men.

To deal with creationism as creationists view it -- as a religious alternative to evolutionary science -- the Ministry has included a "Sensitive Issues" section in the Guidelines. This is supposed to help teachers addressing scientific issues that contradict some students' religious beliefs. Issues likely to be sensitive are the origin of life, biological evolution and the age of the universe (the Ministry lumps these with other "sensitive" issues like abortion). The Ministry gives the teacher two options. 1) The teacher can allow the student to bring **religious** evidence to bear as **science**, or 2) the teacher can excuse the student from studying a sensitive issue and give an alternate assignment. The avenue for this is spelled out in the just-released Senior Biology Guideline. Students in the new OAC (Ontario Academic Course, which replaces the grade 13) are allowed to do independent studies. For the Evolution Unit, "Students can do activity 2b [evidences for evolution described on page 60] as independent study. Some may wish to present an alternative view of biological origins (Part 12, page 9)." What does "alternate view of biological origins" mean?



In each science Guideline teachers are urged to respect alternate views held by students. In the Senior Biology Guideline, Core Unit #5 (labeled The Theory of Evolution), [This too is incorrect. Since Biological Evolution is a fact, the label for this unit should be just "Biological Evolution"], for example, reference is made to "an appreciation of the differences between the origin, development, and nature of scientific theories and other non-scientific modes of explanation, for example, religious. (Part 12, page 59)." The implications of this statement is obvious and potentially dangerous. Since creationists are well organized, they can mobilize to exploit this loophole and insinuate "creation science" into the school system.

Consider a teacher teaching the subject of human evolution and stating that dinosaurs and humans are separated by some 60 million years. Then consider a student standing up and saying that there is evidence that dinosaurs and humans lived together and arguing that this alternative point of view should be heard. A teacher who helped the Ministry draft the Biology Guidelines told me that teachers can defuse creationist arguments, like these, because the basic underlying assumptions are religious. This is not the problem; non-creationists understand that point, but "scientific" creationists portray their arguments as secular, and teachers must be prepared to debunk those arguments on secular grounds.

There is another loophole that creationist teachers can use to promote their "science". The Ministry is allowing schools to devote as many as 20 hours in each subject to a locally-designed unit without Ministry approval. Creationists are claiming that they have a right to include their material. The Creation Science

Association of Ontario sets up booths whenever they can at school displays and conventions. They will be forceful in exploiting any loopholes they can find, including outright rejection of the Guidelines by creationist teachers.

In my opinion, the Ministry should not teach "sensitive issues" in a Science classroom but in a separate Science in Society course. Then, if a student brought up creationist "evidence" in a science classroom, the teacher could tactfully inform the student that such evidence is not science and should be discussed instead in the Science in Society course. Unfortunately, such a course does not exist for everyone. The Ministry does have a Science in Society course, but it is offered only to students going on to higher education. Students who will finish at grade 12 or lower will never have the opportunity to study how science works, the morals of science, the funding of science, science and religion, and the implications of scientific advancement -- topics addressed in this course.

I recommend that creationism be a required topic in a broadened Science in Society course as an example of what is pseudoscience. Not offering Science in Society at the lower levels for non-science students will only widen the gap between those with narrow and broad educations, as noted by Mirsky: "We are becoming an intellectually bifurcated society as an educated minority gets more education while an uneducated majority falls into the featureless morass of ignorance." (1988) Broader education would make it more difficult for people to be duped by pseudosciences like creationism.

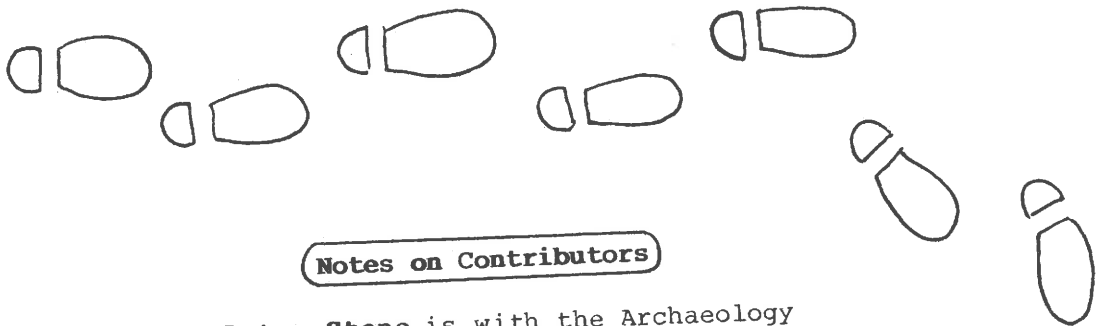
The Ontario Committee of Correspondence has begun giving talks at universities throughout the Province to expose the devices creationists use to promote their

"science". This approach seems to be working. Although we do not always persuade students that evolution is valid, we seem to be defusing support for scientific creationism by exposing the methods creationists use as "unChristian".

The new Science Guidelines are something Ontario can be proud of. For the first time, biological evolution is a core course and a theme throughout earlier biology courses. Even if the Guidelines were worded carefully to eliminate loopholes, creationists would try to get their pseudoscience into the classroom. In fact, in a January, 1988 article in **The Globe and Mail**, creationists said that they were dissatisfied with the Guidelines and vowed to make their case stronger. My concern is not primarily about the Ministry, but about school boards and teachers themselves. We are preparing strategies to deal with this now that we know creationists will be pushing harder.

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