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Welcome

From Lawrence Shirley

Welcome to the new newsletter of the North American Study Group on Ethnomathematics (NASGEm). Since the start of the International Study Group on Ethnomathematics (ISGEm) in 1985, the North Americans have been a big part of the membership and leadership of ISGEm. Part of this leadership has been seen in the location of the ISGEm Newsletter in North America. However, in an effort both to strengthen the non-American aspect of ISGEm, the ISGEm Board moved the international newsletter to be produced in Brazil. This left the North Americans with the exciting opportunity to start our own newsletter especially for NASGEm. We are also pleased that the interim editor of the ISGEM Newsletter, Tod Shockey, has agreed to become the first editor of the new NASGEm Newsletter. We hope this newsletter can become a forum of news, research reports, articles, information on conferences, and a general expression of the ideas and activities of NASGEm members. We would also like to see this newsletter offer a lively exchange of opinions in letters and commentaries. One of the hardest tasks of any newsletter editor is to obtain submissions for publication. I ask you to help Tod by sending him news of your research and classroom activities and your thinking on the directions of ethnomathematics in North America.

In This Issue

Study of Solstice Marker Pictograph Canyon Pintado East Fourmile Draw Site

Photo by: Cathy Barkley, Ph.D., Mesa State College

The darkened sky begins an ever increasing lightening and the valley floor begins to come alive in anticipation of the dawn. As the sharp rays of first light spill over the surrounding hills and mesas, pictographs tucked into an obscure cliff face are now illuminated with the sunlight. Darkened lines of shadow move swiftly over the ancient drawings to once again signal the changing of seasons. The sun markers continue their long vigil over the revolving seasons as they have done for the past thousand years. Their sun watchers and the people to whom the canyon was once home, have been gone for hundreds of years, leaving their designs behind. In the river drainage valley now known as Canyon Pintado, the passage of the seasons is marked in relative obscurity and solitude since the ancient people of the valley are gone.

The emerging fields of ethnomathematics, the study of mathematics and its relation to cultural influences, and archaeoastronomy, the study of ancient sky watchers and their astronomical practices, come together in the study of rock art sites that mark the passage of the seasons.

Evidence of substantial astronomical knowledge by ancient peoples abounds in the southwestern region of the United States. Rock art sites and ancient building remains that exhibit astronomical activity are continually added to a database that now numbers into the hundreds. The interaction of the light marks the equinox days, solstice days, or, in some cases, the cross-quarter days, in many different ways: sun daggers, or beams of light intersecting the drawing in a particular spot; beams of light displayed through the window of building to mark a certain spot on an opposite wall; a tangent line to a display of circles; a direct observation with a horizon line marker and a sun marker. All of these solar markers were made by using specific geometry principles coupled with observations of the heavenly bodies and related light interactions.

Since the "discovery" of the now-famous sun dagger site at Fajada Butte in 1977, other sites have been studied and documented as solar observatory sites. The sun dagger site in the Chaco Canyon, New Mexico complex shows the sun interaction during both equinox and solstices (Williamson, 1984). Once thought to be a unique example of sunlight and rock symbols, it became the first of many documented sites. Many of these sites have common elements in their designs, but each one is unique in its placement relative to the geography of its specific location. Equinoxes and solstices are moments in time and the interaction occurs at a particular time of day; many of the rock art, or glyph markers, operate at midday. A comparison between the time of interaction and the moment of the seasonal event can help in assessment of the precision of the glyph as a solar marker.

To view glyphs or designs as possible solar markers requires persistence and patience since there are only eight times each that possible interaction might occur: two equinox days, summer and winter solstice, and the corresponding cross-quarter days, the days halfway between an equinox and solstice. Cross-quarter days are often more in tune with changes in seasonal weather patterns than the actual seasonally designated days of equinox and solstice. While the solar interactions are much more common on the summer solstice and

equinox days, interaction has also been reported in a number of the summer cross-quarter days also. In a database of 219 observations reported at 45 different sites, by 29 different observers, Fountain reports the following frequency of interaction: (1) summer solstice, 34%; (2) equinox, 32%; (3) winter solstice, 14%; (4) summer cross-quarter day; (5) winter cross-quarter day (Fountain, 1998).

Two categories of solar markers have been used to denote the changing seasons: direct, and indirect. A direct marker is one that is observed by standing in a particular spot and viewing the sun rise or set over a certain landmark such as a notch in the mountain (Malville and Putnam, 1989). An indirect marker is one that is man made by pecking or painting a glyph onto a rock surface. Precise observations would have to be made to accurately draw the indirect marker at the exact spot to mark the sun's pattern of travel. Gnomon markers can be used to establish a seasonal calendar but it is easier to establish the rising azimuth by recording the position of the rising or setting sun as it appears against a particular geographic feature. This practice forms the basis of the horizon calendars used by the Puebloan peoples of today (Charbonneau, 1999).

There is reliable evidence that certain types of circular glyphs were symbolic references to the sun. A series of concentric circles, either pecked or painted, has long been regarded by the Puebolan peoples to represent the sun (Charbonneau, 1999). A dot encircled by two rings is the most common sun symbol of the modern Pueblo people. The spiral form, such as the one found by Anna Sofaer at Fajada Butte, is another common symbol for the sun and its passage. The number of spirals may also have special meaning for the either the sun passages or the lunar cycles. The most commonly reported solstice interaction markers are either circular or spiral, but other interactions have been observed and recorded that make use of geometric, animal shapes, and human-like forms. In the database of 219 observations documented by J. W. Fountain, Tucson, Arizona, the following distribution of glyph types was reported: (1) circular and spiral, 37%; (2) anthropomorphic, 21%; (3) zoomorphic, 15%; (4) other, 27%.

Solar markers have been reported at sites all throughout the southwestern United States. The database of dramatic light interactions continues to grow as amateur archaeoastronomers observe and document these sites. Looking for solar markers requires full familiarity with the site under consideration, a sense of the sun's motion across the sky, and the corresponding ways in which shadows fall across rock faces. Interactions are sometimes much more complex than originally expected.

When looking for a solar rock site, it is essential to note a distant landmark so that true north is located. Interaction possibilities depend on the precise angle of the sun at a particular time of the year. In the southwestern region of the United States, the sun rises north of east in the summer and south of east in the winter; in summer, the sun is higher than in winter. At equinoxes, the sun moves rapidly with regard to the celestial equator at a rate of approximately 0.4 degrees per day. The earth's rotation leads to an apparent daily motion of the sun at a constant angular velocity of fifteen degrees per hour. The sun's equinox altitude at solar noon is equal to 90 - Æ where Æ is the observer's altitude. The equinox to solstice altitude differences at solar noon is approximately 23.5 degrees (Allen, 1998). Interactions change markedly from day to day so observations for any solar interaction must be made on that precise day. At the solstices, the sun seems to stop in its motion, as it changes directions of motion relative to the celestial equator. Solar interactions change little during the week surrounding the solstice. On the cross-quarter day, the sun's motion is approximately two-thirds of that at the equinox.

The solar interaction is not always at the center of a glyph; quite often the light passes through the edge of an object to form a tangent line. The indirect solar markers do not always occur at times of the day special

to us, such sunrise, or noon. Most of the documented interactions actually occur between 10 a.m. and 3 p.m.

This study examined a rock art site attributed to the Fremont people, a culture that existed in western Colorado and eastern Utah. Their "cultural capitol" with extensive rock art sites seems to have been in the northwestern corner of Colorado and northeastern corner of Utah centering around the Dinosaur National Monument and Uintah Basin areas (Castleton, 1984). The major portion of Fremont culture development seems to have occurred simultaneously with the Anasazi development. Fremont culture in this area is generally dated as A.D. 650 – 1200. Sometime after A.D. 1300, it was replaced by the Shoshonis who came from the west.

This study examined a Fremont rock art site for possible solar interactions. One document was found that labeled the site as a "sun dagger site." The study was begun in summer, 2001. The site was located and a general description of the area was recorded. The study continued during the following year and will conclude in summer, 2002. Several similar circle/spiral sites are located in the northwestern corner of Colorado/ northeastern corner of Utah. Few of these have been studied or documented as solstice markers but they may also exhibit sunlight interaction similar to the one in this study.

The site in question is located in Canyon Pintado. The Canyon Pintado Historic District is located in western Colorado in the Douglas Creek drainage basin. More than fifty known rock art sites are located in this area along the creek. The canyon was named by Spanish explorers Fathers Dominguez and Escalante in 1776 when they traveled through the region to California (Rangely Chamber of Commerce, 1999). Because of the unusually large number of pictographs (painted panels), rather than the more common pecked designs, they noted the area in their diaries as the "painted canyon." Pictographs in the canyon are done in two primary colors, red and white. The red tints usually come from an iron oxide base and the white paint comes from gypsum, calcium carbonate, or lime (Mallery, 1886).

One of the most interesting sites in the Canyon Pintado Historic District is located in East Fourmile Draw. This site is approximately .6 mile from the main road. It is an indirect solar observatory site with pictographs on two southeastern facing cliff faces. There is a noticeable notch in the cliff face that allows shadows to fall across the markings on the southernmost cliff during solstice. Markings on the left cliff face include two concentric circles, a spiral, and at least six other geometric or anthropomorhic figures. The center of the spiral is approximately 139 inches from the base of the cliff.

Some of the figures are petroglyphs and have been pecked into the cliff face. The concentric circles are painted in red and white. The top circle has a "bull's eye" of red with a circle of white, then circle of red, then circle of white around it, for a total of three rings of alternating colors around the center. Colors are still quite vivid in this pictograph. We used a stick to measure the approximate sizes of the paintings and compared our non-standard "stick measures" to a flexible yardstick. A second set of measurements was taken using a metal tape with an eight foot length. The top circle was approximately six inches in diameter and the bands of colors grew smaller in width as the circle was drawn around the bull's eye center.

Directly below this set of concentric circles was the spiral painted in a white color. The white has faded and can be

difficult to see if the light is too bright. The spiral is a counter clockwise, or counter sun travel, rather oblong flattened spiral. There are seven turns in the spiral and a white "bull's eye" beginning. It appears to be tangent to the circle above it at a midpoint for both the concentric circles and the spiral. The spiral measures approximately 7 inches across and 11 inches high. In comparing the measurements for the length and width of the spiral, the ratio equals approximately 1.57. This number is surprisingly close to that of the golden ratio, Æ, phi, that is used extensively in the ancient Greek empire. Exact measurements are difficult as the face of the cliff has a slight curve or bulge to its surface and thus tends to "warp" the straight line geometry of the figures. Use of specific geologic features is common among the documented solar sites; a curve on the surface of the rock, a fissure in the cliff face, lichens or natural markings, are all used to help illustrate the movement of the sun at various solar sites.

The second concentric circle is located to the right of the spiral at a midpoint of the spiral and the circle. The two do not quite touch. It appears that the set of concentric circles were painted like the ones above the spiral but the paint seems to have faded over the years. This set of circles is approximately eight inches in diameter.

In addition to the circles and spiral, at least six other figures are scattered about the cliff face. Some have paint on them, and one of the figures is done in the reverse paint, or "negative photograph image" style. The figures are quite faded but seem to fit the classic Fremont style of boxy, elongated torsos with missing arms or legs. A small white figure appears at the top of cliff and is only visible in deep shadows.

On the right side of the notch in the cliff face, there are three sets of geometric figures visible. A rectangle, an incomplete circle, and another incomplete rectangle holding a rectangle is opposite the set of circles. A small pecked dot lies within the incomplete circle. This symbol of a dot within a circle has been interpreted as "to hold here" or stand still." The rectangular symbols indicate a field or place of a particular group of people (Mallery, 1886). Taken as one reading, this could be interpreted as "the sun holding place." Since the sun appears to stop at the summer solstice, this would be interpreted as a site where this phenomenon could be seen.

Beneath the cliff face, there lies an unusual boulder that tapers from its base on the ground to a larger, flattened area at the top. It is approximately four feet high. Several rows of peckings are visible on the front side away from the cliff. On the left side is an irregular pattern on dots. On the right side, the dots appear to be pecked into five rows with a large space between rows two and three. The first four rows have six dots each and the last row has four dots. This rock could have been used as a solar count or solar observatory. The number of days in a month would vary since they were observing the changing moon in the sky rather than looking at the abstraction of the calendar that we use. Sometimes a month would seem to be twenty-eight days long and at a different time, it might appear to be thirty-one days in length (Hudson, 1984).

A group of mathematics students from Mesa State College and I have visited the purported solstice at four different times: Fall Equinox, September 21, 2001; Winter Solstice, December 21, 2001; January 15, 2002 (a non-significant day in the sun calendar for comparison); Vernal Equinox, March 20, 2002. As predicted by the Solmar database, solstice interaction was evident at the equinox times but not during the winter solstice.

The first observation during the Fall Equinox did show a spectacular use of the existing landscape and the man-made designs. The interaction of the shadows with the pictographs occurred at 9:55 Mountain Daylight Time. The sunrise time from a standard chart does not correspond with the actual sunrise time at the site due to the position of the mountain to the east. Sunrise in Grand Junction, Colorado, September 22, 2001 was 6:02 a.m Mountain Standard

Time. The shadow interaction begins at the upper left of the first cliff and steadily moves to cover the entire face of the cliff. At about 9:50 a.m. the shadow was tangent to the top concentric circles. The shadow line appears tangent to both circles, one above and one below, and to the spiral by the end of the morning sunrise (9:55 a.m.). The line of tangency does not appear any other times; the shadows appear on the cliffs at the upper left hand corner and travel downward until the lower edge of the shadow forms the tangent line. This interaction is different than the "sun dagger" bead of light that highlights a particular spot on a wall or projects the beam onto a petroglyph/ pictograph figure. However, it does appear to be an interaction of significance since this special tangent line does not appear on other viewing days. The shadow line falls right along the crack in the cliff that splits the symbols on the cliff face.

The viewing of the site at Winter

Solstice revealed no shadow interaction with the figures on the cliffs. We viewed the site from 8:00 a.m. until 10:30 a.m. and saw no interaction during this time. The shadows were not aligned with any of the figures on the cliffs.

We again viewed the cliffs and shadows on Spring Equinox, March 20, 2002, to see if the shadow interaction would again be visible. At approximately 8:40 a.m. Mountain Standard Time, the shadow line appeared tangent to the top set of concentric circles. This time was approximately an hour and ten minutes earlier than Fall Equinox. At 9:10, the shadow was tangent to both circles and the spiral. The point of the shadow again followed the center crack in the cliff as it did during the Fall Equinox. Since the position of the sun was in the middle of its celestial journey between the farthest winter point to summer point, the angle of the shadows should have made the same patterns on the cliffs as those made for the Fall Equinox.

The site was again observed during Summer Solstice on June 21, 2002. Sunrise according to the Grand Junction sunrise chart was 5:48 a.m. Mountain Daylight Time. At 8:01 a.m. the shadow fell across the top bull's eye. By 8:08, the shadow was tangent to the top bull's eye and the spiral. By 8:17, the shadow had advanced to become a tangent line the second bull's eye and dropped below the second ring on the spiral. At 8:30, the shadow bisected the center of the spiral and the lower bull's eye. There seemed to be significant interaction regarding the positioning of the shadow line as a bisector but it was clearly not the same type of interaction evidenced by the equinox shadow play. From the farthest point at winter solstice to the farthest point at summer solstice, an angle of 60 degrees is formed; the equinox lies directly between the two, so it seems reasonable to have observed the same type of interaction on both equinox viewing days. Early records indicate that sun shamans used an outstretched hand to approximate the location of the sun relative to its celestial year since the hand width is approximately equal to 60 degrees also.

This site and its solar interaction has been recorded in the Solmar database since the study has been completed following the summer solstice, June 21, 2002. The site has now been viewed through the cycle of a complete solar year.

A review of other Fremont sites in the northwestern Colorado/northeastern Utah region reveals several sites with sun symbols and spirals similar to those in the East Fourmile Draw site (Castelton, 1984). This study could be extended to include them in the Solmar database (Fountain, 1998).

Solstice interactions are cleverly done with the designs placed in isolated spots, hidden from the casual observer of today. Study of these sites is often difficult because of their geographic isolation and the weather patterns of the region (Wheelwolf, 1999). The opportunities for viewing solstice interactions occur, at most, eight times a year, and the interactions may not occur on each of the equinox, solstice, or cross-quarter days.

By studying these ancient astronomy sites and observing the solstice interaction on significant seasonal days, our picture of the ancient builders of the sites changes. The petroglyphs and pictographs used as markers of special times of the year were not placed on the cliff faces in a random manner. Observations were made of the sun and its travel; then, careful attention was paid to the precise angles needed for alignment on equinox and solstice days. Through the lens of ethnomathematics, we begin to see a more complete picture of these ancient peoples.

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THE ALGORITHM COLLECTION PROJECT (ACP)1: AN EXPLORATION OF THE ETHNOMATHEMATICS OF BASIC NUMBER SENSE ACQUISITION ACROSS CULTURES

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Abstract

This discussion focuses on the interactions between culture, the language(s) spoken, and the particular algorithms used by recently arrived high school immigrant students attending an inner-city high school in Northern California. Using a Brazilian research paradigm employing strategies of ethnomathematics and mathematical modeling, students develop an understanding between the relationships of an individual's language and the algorithms they use.

Theoretical Foundations

Many people experience mathematics negatively. Many more students have difficulty in performing basic arithmetic operations that may ultimately exclude them from full participation in society. Comparable populations across the world have fewer problems with mathematics than do American students (TIMSS, 1997). Facility with the algorithm one uses, which includes its unique history and culture, most certainly contributes to one's success or failure in mathematics.

A fundamental aspect of this project respects the importance of this interaction, that of the language(s) spoken and the algorithm used, that combine to form individual abilities and/or disabilities in mathematics. Success during early attainment of arithmetic operations, accomplished at the same time we learn language, forms the basis for how successfully we can learn advanced mathematics. Work with mathematics learners in other countries (Orey, 2000, 1999, 1998), combined with data gleaned from the Third International Math Science Survey suggests that true reform, insuring successful mathematics attainment for all, is extremely complex. An in-depth study of the type of algorithms used has important international significance as well.

Project Design

The design of the project encompassed a three-step process:

Collection: The ACP used a Brazilian modeling protocol (Orey & Rosa, 2001) which conducts interviews of recently arrived immigrants in relation to their mathematics. Cohorts of graduate and student teachers were asked to interview recently arrived immigrant students related to the attainment and use of

the four basic facts in mathematics. As part of course assignments, students have asked questions, and assisted in developing a vocabulary collection of over 35 languages, as well as the learning and use of the four basic facts in mathematics - addition, subtraction, multiplication and division.

Analysis: The PI interviews students at Encina High School, where he has been a volunteer visiting professor in the mathematics department for over 4 years. The samples are analyzed using interview data, for diverse protocols, and error patterns distinctive to each algorithm and its ethnomathematical content. During the pilot study, 16 groups were represented; it has grown to 35 found in the Sacramento region. The initial pilot study uncovered four patterns for long division used by the high school students (see appendix).

Dissemination: Pilot study data, was used to construct a new course objective for mathematics methods students. Where students are asked to interview a newly arrived immigrant. Data gleaned from this work has been used to develop curriculum strategies for teacher educators in both California and Brazil through numerous seminars and workshops given by this writer. As well, the findings were shared on Public Radio2, at the California Mathematics Council Asilomar Meeting, NCTM and though The International Study Group on Ethnomathematics3 network.

Research Question and Significance

Do algorithms we use have cognitive, as well as pedagogical significance for their users? Recent research suggests that one's mother tongue influences one's personal form of cognitive processing (Holtz, 2001; Devlin, 2000). This unique interaction of language and written language, suggests that American children may possess unusual difficulty with the algorithms they learn. Educators in many countries are surprised to find that common day-to-day algorithms differ by culture and by national origin.

For example, the pilot study data suggested that there might be at least four major patterns used for long division in our region, where only one is taught formally. The ACP has collected long division algorithms used by newly arrived ninth graders that fall into four major styles or patterns. For purposes of this study, they are called: *North American*; *Franco-Brazilian*; *Indo-Pakistani*; and *Russo-Soviet* (see appendix).

Context

Early colonization enabled, for better or worse, alternative ways of thinking and learning to be exchanged between diverse groups of people. This process continues in many places where immigration and urbanization have brought together members of diverse cultures. Northern California is part of this phenomenon, where over 180 different cultures and languages interact. This is clearly a case for studying "what works" across cultures in relation to number sense acquisition. The pilot study uncovered relationships between mono-, bi- and multilingualism, the algorithm used and student ability and confidence. For example, some language groups use the comma (,) for the decimal, which can be cause for some confusion for scientists, business people, students and educators. Mistakes in measurement, often deadly, in translation between standard and metric measurements are legendary. Thus, a strong case can be made for studying "what works" across cultures in relation to number sense acquisition. What is a surprise to many educators are the successful methods for learning, memorizing, calculating and communicating answers that differ across cultures.

Much of what has been studied in both ethnomathematical and multicultural contexts has been related to the ancient ways of doing algorithms. For example, it is common for textbooks in many countries, to introduce

Roman and Babylonian number systems, medieval-Russian peasant addition, Napier's bones and other such activities as historical curiosities. It is also quite common to study certain aspects of Aztec-Mayan math.

This study is built upon data collected, organized and developed from 1999 to the present, in an inner city public high school in Sacramento, California. A Brazilian graduate student, Milton Rosa, serving as a visiting foreign exchange teacher in mathematics, was having difficulty in using and explaining the standard North American algorithm to his students as prescribed by the curriculum, and realized that his method also differed from that of a number of his students (see examples from Brazil and Kazakhstan). He asked his students to demonstrate how they learned to do long division in their former schools.

What is Ethnomathematics and Mathematical Modeling?

Ethnomathematics forms the intersection between mathematics and cultural anthropology. It was introduced by Ubiratan D'Ambrosio (2001) who explained that ethnomathematics is the "art or technique of explaining reality within a proper cultural context", and describes all the ingredients that form the cultural identity of a group: language, codes, values, jargon, beliefs, food and dress, habits, and physical traits. Ethnomathematics defines a broad view of mathematics, and includes ciphering, arithmetic, classifying, ordering, inferring, and modeling.

In this context, "ethno" and "mathematics" are understood in the broadest possible sense. *Ethno* refers to a broad concept of cultural groups, and not an anachronistic concept related to race or exotic groups of people; *mathematics* is to be seen as a set of activities such as *calculating, measuring, classifying, ordering, inferring, and modeling*. This perspective, using ethnomathematics, enables us to see the diversity around us as a resource.

The construction of mathematical concepts incorporates the reality of each individual. This begins by placing new situations and problems in front of a child for them to master within their own context and experiential reality so that math concepts are learned with a focus on the understanding and resolution of problems that we "do" mathematics. Learners must have experiences that enable them to learn how to break a problem situation into manageable parts; create a hypothesis; test the hypothesis; correct the hypothesis; and make transference and generalizations to their own reality. Activities involving mathematics should enable opportunities for: open-ended exploration; appropriate project work; group and individual assignments; discussion; and practice using a variety of mathematical methods, tools, and techniques. It is no longer acceptable that the intellectual activity of a child is exclusively based on memorization and testing, or for that matter only with the application of archaic knowledge, which serves only to increase math avoidance.

Using an ethnomathematics based pedagogy, a teacher can introduce their learners to new tools and techniques directly connected to the real life of the learner, help them to practice becoming proficient in their use, and guide them towards sophisticated mathematical applications. It is through "context" that the teacher creates additional explanations and ways to work within a "mathematically based reality".

This work within a mathematics reality is related to the "transforming action" (Freire, 1997) that looks to reduce its degree of complexity through the choice of a model where representations of this reality are derived by enabling the exploration, explanation, and increased comprehension of the concept. This is why cross-cultural study of basic algorithms allows us to reflect on the inherent possibilities, and for these same possibilities to become the object of critical analysis by the learners themselves. The process in which we consider,

analyze and make ongoing reflections is called modeling.

In making mathematics accessible for all students, educators must create conditions for increased involvement by all students (Orey, 1998; NCTM, 1999). Ethnomathematics suggests that modeling become a significant part of classroom pedagogy whereby good models are elaborated, demonstrated and shared freely, much as children discuss computer game techniques or soccer. Students learn as they apply models and see mathematics as something practical if it is valuable to them.

The way to introduce students to mathematical modeling is to expose them to a diversity of problems and models that include mathematical interpretations of problems, which in turn, are representations of models under study. When we analyze a given situation for its mathematical perspective, the teaching and learning process becomes more than an over emphasis on rote memorization of basic facts. One effective place to begin this study is in the way that we personally compute or calculate, that is, a study of the algorithms diverse people use on a day-to-day basis. Mathematical questions are used to explain and to make forecasts on phenomena in the real world. What is interesting from an ethnomathematics point of view is that many of these explanations are unique from one culture to another, and of course, this works for algorithms that people use to make basic day-to-day calculations. Many of these diverse perspectives are used in representing situations for the study of alternative techniques used to make calculations.

Goals for Teachers and Students

By bringing alternative strategies together, teachers and students learn to flexibly solve problems, use alternatives when one strategy does not work, and look at "best practices" from a global view. This project initially gathered a modest representative sample of the basic arithmetic algorithms used by peoples originating in diverse cultures. The data from this project was used to further refine this work and develop a number of curricular activities that make use of this unique resource as found in this author's community. As described above, this data is used to develop the ACP website and course materials that enable educators to draw upon alternative forms of calculating by making use of options or choices, which are attuned to diverse linguistic, cultural and cognitive abilities of individual students.

Reflections

A number of interesting things happened as an outgrowth from this activity. A few preservice students were extremely nervous about contacting someone to interview, "I do not know any one from another country" was heard a number of times. Together as a class, we brainstormed a number of possibilities. These included: going to the Student Union, sitting and listening, and politely introducing yourself and asking if the person speaking another language was a foreign student, and if they would be interested in being interviewed; contacting parents of children in the student's field placement, or a church or local groups; contacting the University Multicultural Center; and contacting the Department of Foreign Languages.

Interestingly enough, students who expressed the most reluctance, stated that they enjoyed the activity the most. All interviewees in the sample mentioned how happy they were that Americans were interested in knowing something about their culture and ways of doing something as basic as arithmetic. The classes developed lists of vocabulary words, mathematical terms, numbers from 0-10 etc, wrote the words on index cards and hung them in the classroom, so we could compare each language.

Additions to this activity often include: Conversion formulas - standard to metric, time zones, etc.; vocabulary lists in languages not represented by this study; the four basic operations, square roots; tricks for resolving problems; and a discussion of how the participants memorized the basic facts. Almost all students who have participated in this activity have come away with a greater appreciation of "more than one way to solve a problem" a greater appreciation for cultural diversity, a new understanding for how hard it is for newly arrived students to adapt to life in a new country.

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Appendix I.

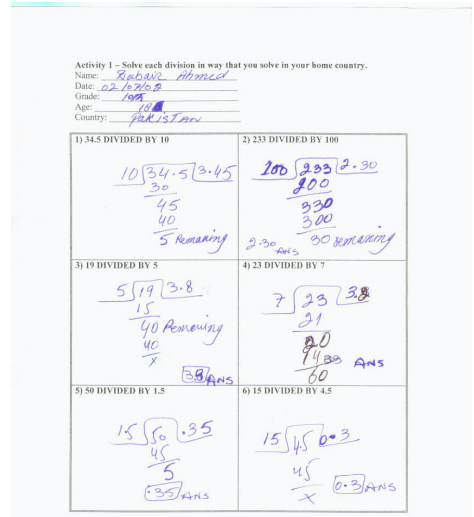
Examples of Long Division Algorithms

(Footnotes)

1 *http://www.csus.edu/indiv/o/oreyd/Alg.html*

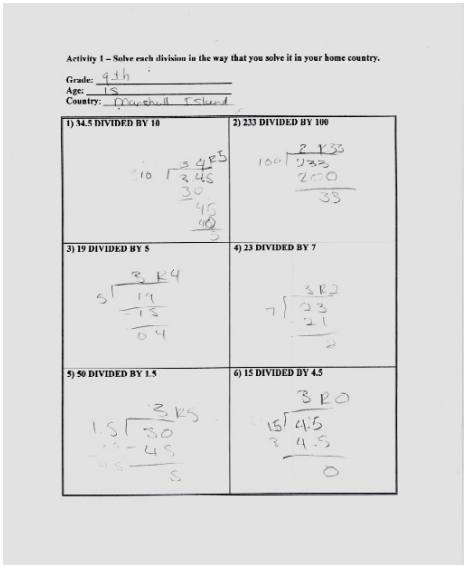
2 http://www.csus.edu/indiv/o/oreyd/exchange.html

3 http://www.rpi.edu/~eglash/isgem.htm



Activity 1 – Solve each division in way that you solve in your home country.
Name: RUBAIZ Ahmed
Date: 02/07/08
Grade: 10th
Age: 16
Country: PAKISTAN

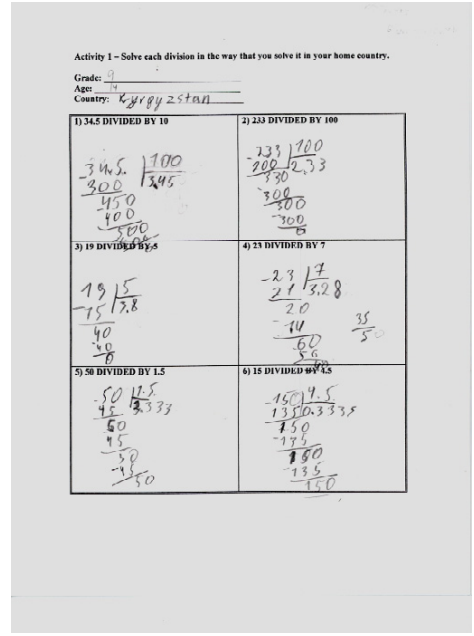
1) 34.5 DIVIDED BY 10	2) 233 DIVIDED BY 100
10 | 34.5 | 3.45 30 45 40 5 Remaining	100 | 233 | 2.30 200 330 300 30 Remaining 2.30 ANS
3) 19 DIVIDED BY 5	4) 23 DIVIDED BY 7
5 | 19 | 3.8 15 40 Remaining 40 X 3.8 ANS	7 | 23 | 3.8 21 20 14 60 56 4 ANS
5) 50 DIVIDED BY 1.5	6) 15 DIVIDED BY 4.5
15 | 50 | .35 45 5 .35 ANS	15 | 45 | 0.3 45 X 0.3 ANS



Activity 1 – Solve each division in the way that you solve it in your home country.

Grade: 9th
Age: 15
Country: Marshall Island

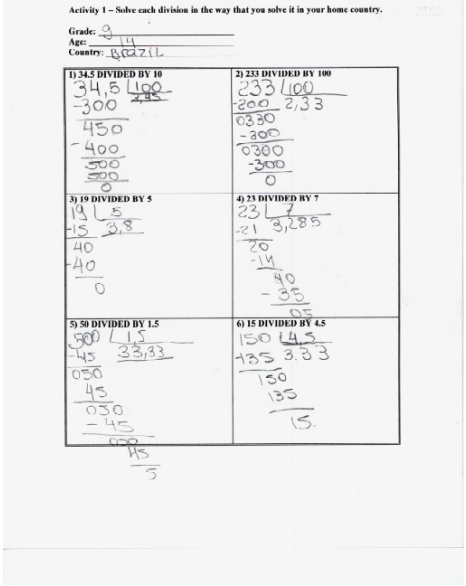
1) 34.5 DIVIDED BY 10	2) 233 DIVIDED BY 100
10 | 34.5 | 3.45 30 45 40 5	100 | 233 | 2 R 33 200 33 0
3) 19 DIVIDED BY 5	4) 23 DIVIDED BY 7
5 | 19 | 3 R 4 15 04	7 | 23 | 3 R 2 21 2
5) 50 DIVIDED BY 1.5	6) 15 DIVIDED BY 4.5
1.5 | 50 | 33 R 0.5 45 5	4.5 | 15 | 3 R 0 13.5 0



Activity 1 – Solve each division in the way that you solve it in your home country.

Grade: 9
Age: 14
Country: Kyrgyzstan

1) 34.5 DIVIDED BY 10	2) 233 DIVIDED BY 100
34.5 | 100 300 450 400 500	233 | 100 200 | 2.33 330 300 300 300 0
3) 19 DIVIDED BY 5	4) 23 DIVIDED BY 7
19 | 5 15 | 3.8 40 40 0	23 | 7 21 | 3.28 20 14 60 56 4
5) 50 DIVIDED BY 1.5	6) 15 DIVIDED BY 4.5
50 | 1.5 45 | 33.33 50 45 50 45 50	150 | 4.5 135 | 0.333 150 135 150 135 150



Activity 1 – Solve each division in the way that you solve it in your home country.

Grade: 9
Age: 14
Country: BRAZIL

1) 34.5 DIVIDED BY 10	2) 233 DIVIDED BY 100
34.5 | 100 -300 450 -400 500 -500 0	233 | 100 -200 | 2,33 0330 -300 0300 -300 0
3) 19 DIVIDED BY 5	4) 23 DIVIDED BY 7
19 | 5 -15 | 3,8 40 -40 0	23 | 7 -21 | 3,285 20 -14 40 -35 05
5) 50 DIVIDED BY 1.5	6) 15 DIVIDED BY 4.5
500 | 15 -45 | 33,33 050 45 050 -45 05 5	150 | 4,5 -135 | 3.33 150 135 15.

Dancing Numbers!: An Alternative Mathematics Instruction

Jim Barta – Utah State University

Perso (2002) contends that the mathematics taught in schools exclusively reflects a "western-techno mathematics". Its roots lie in the creation of a thought pattern resulting from a Cartesian worldview developed in the 15th century that has since been accepted as the standard for not only mathematical and scientific endeavors, but has been infused into virtually every aspect of modern society around the world. This perspective includes a perception of linear deductive logic and separate objectification of the world and things found in it.

For the Native American student, this cultural disconnection poses additional obstacles for achievement. It is as if the child were being asked to see through two different pairs of glasses; one which includes a perception of "reality" based on a reliance of the western worldview and the other the subject, whose concepts, content, and information are all encased in a cloak of western impression and definition. "Many Native children may struggle with mathematics because for them the numbers don't dance." (personal conversation with Elmer Ghostkeeper, February 13, 2000). From a western perspective, such a comment has little meaning, but not so if one considers the insight from an indigenous perspective. Pause for a moment and ask yourself how you would describe a "dancing number". Allow yourself to ponder freely and draw your own conclusions. Juxtapose your impressions with the traditional mathematics instruction you were likely to have received as a child. Know that such prescriptive instruction still occurs in some schools today.

Dancing Numbers is the name given to recent efforts to create culturally inclusive mathematics curriculum for Native American students. Dancing Numbers is more than instructional activities whose context emanates from a Native tradition or craft. Its perceptual framework originates in an indigenous worldview. The challenge is to seek instruction that treats knowledge as culturally situated and dynamic and learning as relational and holistic. Here, the learner plays an active role in seeking personal understanding and meaning through the development of a relational involvement in what is studied. A sense of the spiritual nature of human interaction with one another all that surrounds and tied with a sense of service to others are benchmarks of the curriculum. In subtle ways using such a perspective, objects, numbers, concepts, and figures begin "to dance" for and with the learner. This vision of education may be well suited for Native American students. This curriculum may be used to help rejuvenate those students who have previously had to discount their native ways of knowing to succeed in schools, which heretofore exclusively promoted a western worldview.

Note: These efforts are in their infancy. This dream has just begun and I am seeking others who might be interested in working together to dream more deeply and broadly. Please contact me if you so desire – jbarta@coe.usu.edu

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numeracy of indigenous children. Churchill Fellowship Report. 1-38. West

Perth, AU: Churchhill Fellowship Trust. http://www.churchilltrust.com.au/

Ethnomathematics Place in Teacher Preparation Programs

By: Amy Dyal - Graduate student at the University of Florida,

I was a first semester graduate student at the University of Florida, before I was ever introduced to the idea of Ethnomathematics. I decided to enroll in a Multicultural Mathematics course that introduced the idea of connecting math to the student's culture.

There were two main components to this class: activities and core course component presentations. First, the activities introduced me to ethnomathematics and sparked my curiosity. The activities were lesson plans or activities that involved mathematics and were developed based on one of five regions: Africa, Asia, Europe, North America, and Central and South America. The activities identified the various ways people used mathematics in their day-to-day activities, such as sewing and/or quilting, games, trade, building construction, calendars and time, etc. Secondly, the presentations gave me more information on ethnomathematics, including background on what it is, why we should use this method in the classroom, groups or individuals related to invention of ethnomathematics, etc. For the presentations we were divided into groups of two and assigned a topic to present to the class. My partner and I received "ethnomathematics," and up until this point we had only discussed multicultural education and had never been introduced to the term ethnomathematics. However, we quickly learned they were closely related. We researched the topic a lot for our presentation, but my curiousity did not stop there. Afterwards, I still continued to research the topic because it seemed like a great approach to teaching mathematics.

As a child, I was often intimidated by mathematics because it seemed so abstract and/or distant from my everyday life. As a child, you wanted and possibly even need to make personal connections to truly understand the idea. While I always received good grades in mathematics, I never truly understood the ideas presented to me, I simply did the algorithms and procedures given to me by the textbook or the teacher. However, this only led to a superficial understanding of the material and I was unable to apply those concepts into other situations. Often I would have to be re-taught those same procedures in later mathematics classes. However, if I would have been taught using ethnomathematics, I feel things would have been better or easier for me. I would have greatly benefited from the connections between math and my day-to-day life. Mathematics can be found in sewing, calendars, architecture, trade, and many other things that I willingly participate in without even realizing the mathematics that is involved. Participating in explorations, as an elementary student like those in my multicultural mathematics class, would of allowed me to build self-confidence in mathematics, realize that it can be "conquered" and that I can be successful in mathematics.

Not only did these explorations, presentations, and individual research I did make me think about my mathematics as a young student, but it also made me think critically about my previous mathematics methods course. Why had I not been introduced ethnomathematics before? Creating a personal connection for students is a central component of all my other methods courses. Why are teacher preparation courses in mathematics behind, when mathematics is a subject that most often alienates or intimidates students?

Ethnomathematics has so many positive benefits for students. First, as stated before, it creates a personal connection that other teaching styles or methods simply do not provide. Students, especially at the elementary school level, need to see the material they are learning is useful in their everyday lives. They need to see the value of learning the material presented to them. Students will be more interested and engaged in activities they feel ben-

efit them in some way. Secondly, it allows students to develop a sense of pride in their culture. When students see contributions their culture has made to mathematics, no matter how big or small, they will develop a sense of pride about who they are and where they come from. This pride will transfer over into self-confidence and will help them to take risks that they were unwilling to take before. Also, students acquire self-confidence by realizing they have been using mathematics, without even knowing it, in many of their daily activities. Ethnomathematics also helps to foster tolerance and acceptance among the children because they learn that each culture is valuable. As you can see, helping the students to create a personal connection with the mathematical material will affect so many aspects of that child's life.

As a student of mathematics, I was able to experience the positive benefits of ethnomathematics firsthand. I am extremely disappointed that I had not been introduced to this method, or teaching approach, before graduate school. Ethnomathematics should be part of all teacher preparation courses. There are many future teachers who did not attend graduate school or who decide to enroll in another math methods course and as a result they missed the opportunity to learn about ethnomathematics. I have several friends who just graduated from another university, and I asked them if they had ever heard of ethnomathematics. Unfortunately, they all answered no. As a result, their students will not be receiving this type of instruction. I believe learning about and implementing ethnomathematics in the their future curriculum will allow their students to truly understand mathematical content and make them all want to become life-long mathematicians.

Contact: amydyal@yahoo.com

Survey on
PREVAILING CLASSROOM CULTURE FOR SCHOOL MATHEMATICS

Back in 1987, the following passage, which appears below, stood out to me boldly while I was reading Alan Schoenfeld's Cognitive Science and Mathematics Education. Over the years, I have shared the passage with numerous audiences of mathematics educators, school teachers, and with graduate and undergraduate students. I have continued to be struck by the consistent resonance it seems to have had throughout that time with members of those groups. Recently, I shared the quotation with those attending a session I presented at the Northeastern Regional NCTM Conference in Boston in November. As usual, attendees signaled that it seems to be a reasonably accurate thumbnail description of the general pattern of teaching and learning mathematics in schools in the United States.

I didn't gather any data from those attendees, and I began to wonder what mathematics educators would write down as a reaction to these words by Schoenfeld. After all, the state of mathematics education in the US today is seemingly complex. NCTM has published four standards documents since 1989, a number of reform curriculum development initiatives have published materials that are in use in various schools around the country, apparently lackluster performances of US students on international mathematics tests have captured attention in US public, policy, and professional circles, and assessment of student performance in mathematics is a statutory requirement in many states. The assessment movement and the tests it has spawned have generated controversy over the extent to which the testing facilitates or disrupts student learning of mathematics.

To explore this matter, I have turned to you, mathematics educators in the

readership of the Newsletter of the North American Study Group on Ethnomathematics for reflections and comments on Schoenfeld's observation. If you would like to participate in this inquiry, please send your response to me by email or by surface mail:

Fredrick L. "Rick" Silverman
Department of Elementary Education
Campus Box 107
University of Northern Colorado
Greeley, CO 80639
flsilver@aol.com

If you don't mind doing so, please give your name, contact information (phone, surface mail address, and email), position you hold, a statement about your experience as a mathematics educator, your assessment of Schoenfeld's words, and ways in which ethnomathematics might have influenced your perspective.

Thank you very much, Rick Silverman

Comments by Alan H. Schoenfeld on PREVAILING CLASSROOM CULTURE FOR SCHOOL MATHEMATICS

Schoenfeld, Alan H. (1987). Cognitive Science and Mathematics Education, Lawrence Erlbaum Associates, p. 27.

Suppose that during your entire academic career, every mathematics problem that you were asked was in fact a straightforward exercise designed to test your mastery of a small piece of subject matter. You were expected to solve such problems in just a few minutes: If you did not, it meant that you had not understood the material and the material should be explained to you again. Suppose in addition that this scheme was reinforced in class: Problems were expected to be solved rapidly, and teachers gave you the solution if you did not produce the answer quickly. Having had that experience over and over again, you might eventually codify it as the following (implicit) rule: When you understand the subject matter, any problem can be solved in 5 minutes or less. The stronger form of this rule is even worse: If you fail to solve a problem in 5 minutes, give up. Unfortunately, this story is not hypothetical: My research indicates that this belief and a number of equally counterproductive beliefs about mathematics are all too common among our students.

Creeping up in the oddest places:

These are two publications whose writers capture Gloria Gilmer's passion for ethnomathematics.

"Cornrow calculations (or Math is Beauty)" by Toni Wynn in Tenderheaded: A Comb-bending Collection of Hair Stories (edited by) Juliette Harris and Pamela Johnson. Pocket Books, New York, 2001, pp. 63 - 69.

"Gloria: A Mission in Ethnomathematics" in When the members are the Missionaries: An Extraordinary Calling for Ordinary People by A. Wayne Schwab. Member Mission Press, Essex, New York, 2002, pp. 61 – 68.

Dream Catching 2003

Conference Information – Dream Catching 2003 is a professional development workshop focusing on First Nation's perspectives and educational initiatives. Here you can explore math, science, and IT integration in a hands-on, interactive setting. The workshop is sponsored by the Native Access to Engineering Program at Concordia University, Montreal, Canada and will be held from February 19 until Saturday, February 22, 2003. For more information visit: http://www.dream-catching.com/start.htm

DreamCatching 2003
http://www.dream-catching.com/

"DreamCatching 2003 is a professional development workshop where you can explore math, science, and IT integration in a hands-on, interactive setting. Our workshop facilitators and speakers will spend 4 days helping you discover new ways to spark and capture the dreams of your students. Come join us to share what you know with others and to learn about effective methods and innovative resources that will bring new life and excitement to your class room." This workshop is sponsored by the Native Access to Engineering Program at Concordia University, Montreal, Canada and is held from 19 February through 22 February.

Have you seen these recent publications?

Eglash, R. "Race, Sex and Nerds: from Black Geeks to Asian-American Hipsters." Social Text, 20:2, pp. 49-64, Summer 2002

Eglash, R. "A Two-Way Bridge Across the Digital Divide." Chronicle of Higher Education, pg. B12, June 21 2002.

Eglash, R. and Bleecker, J. "The Race for Cyberspace: information technology in the black diaspora." Science as Culture, 10:3, 2001.

"The Kolam Tradition", by Marcia Ascher in *American Scientist* , Jan-Feb 2002, pp. 56-63. An abstract of this can be found at www.americanscientist.org/articles/02articles/ascher.html

The Distributed E-Learning Community for First Nations Science Education, Native Access to Engineering Program

Scholars and practitioners at the Native Access to Engineering Programme (NAEP) at Concordia University in Montreal have been working since 1993 to address the underrepresentation of Aboriginal people in the pure and applied sciences in Canada. The program has been developing and distributing culturally appropriate math and science curriculum in hard copy for six years. Designed and written with input from the Native communities, the curriculum makes connections between "academic" math and science, traditional practice, and community economic development.

Program Director Corinne Jette' strongly believes that all children can and will succeed if the instruction they receive incorporates values, beliefs, and physical examples of the cultural community's lived experiences. The site offers a variety of information and activities for teachers with a specific focus on First Nation's perspectives. For more information visit: http://nativeaccess.com/

From the Editors

Here is volume one, number one of the North American Study Group on Ethnomathematics Newsletter. Thanks to Ron Eglash for the wonderful cover.

We need your help with the success of the newsletter. For folks that have been "away" Ethnomathematics is gaining momentum and respect. If you visit enc.org and do a site search you will find in excess of forty listings. The Annual National Council of Supervisors of Mathematics meeting is hosting the Annual Ethnomathematics Reunion and there are numerous sessions at the upcoming National Council of Teachers of Mathematics Annual Meeting that deal with Ethnomathematics.

Our own ISGEm session at the annual NCTM meeting will be on Thursday, 10 April 2003 from 8:30 a.m. until 10:00 a.m. in room 007 of the convention center. We have a promising panel of presenters: Dr. Dawn Andersen, California State – Fullerton; Dr. Ron Eglash, Rensselaer Polytechnic Institute; Dr. Daniel Orey, California State University – Sacramento; Mr. Milton Rosa, Encina High School, Sacarmento, CA; and Dr. Jerry Lipka, University of Alaska – Fairbanks.

For our colleagues working with graduate student please suggest that they consider submitting to the newsletter. To

our colleagues teaching courses with Ethnomathematics in the course title or Ethnomathematics threaded through your curriculum please consider submitting classroom insights, experiences, and pedagogical and curriculum issues. If you are presenting Ethnomathematics work please consider sending us your presentation abstract and the venue.

Even as this newsletter is being finalized Jim Barta, on sabbatical at Concordia University 2002 – 2003, submits a web site well worth visiting.

http://193.75.136.14/~dhuylebrouck/Ishango_web/Ishango_web.htm

Please accept our invitation to join NASGEm. Daniel and I look forward to the upcoming NCSM and NCTM meetings and the opportunity to say hello.

Tod Shockey
Mesa State College
tshockey@mesastate.edu

Daniel Orey
California State – Sacramento
orey@csus.edu

HELP WANTED!

Translators of publications Displayed at ICEM-II .

SIG coordinator, Gloria F. Gilmer, seeks translators and/or interpreters of about twenty publications - written in Portuguese- which she brought from the Second International Congress on Ethnomathematics (ICEM-II). These publications should inform a proposed SIG project to popularize ethnomathematics in North America. If you can assist in any way, please send comments to Ggilme@aol.com.

To sign up for membership in the Math and Arts SIG, please write to Ggilme@aol.com.

Evaluation of Culturally-Situated Design Tools in the Recruitment and Retention of Under-represented Minorities for Information Technology Careers
Ron Eglash and Audrey Bennett,
Rensselaer Polytechnic Institute

Research on under-represented minority students making their way through the IT career "pipeline" has located specific features of the educational experience in which these students are lost. Many of these problems can be attributed to a tendency to see their cultural identity as separated from (and even antagonistic to) the curriculum leading to IT careers. The PI's previous research has initiated the development of culturally-situated design tools that address this conflict. These software tools use ethnomathematics—the mathematical practices embedded in artifacts such as native american beadlooms, african american cornrow hairstyles, graffiti, etc.— to teach students how their cultural background can become a bridge, rather than a barrier, to information technology careers. This research will finalize the software development for integration into standard curricula, and evaluate its use by secondary students in RPI's local GEAR-UP program over a three year period. The software is available online at http://www.rpi.edu/~eglash/csdt.html.

Special Interest Groups (SIGs)
Gloria Gilmer

Have you ever contrasted previews of coming attractions at the cinema with reviews of math books? Well, a new NASGEm – SIG will be doing just that! Watch NASGEm create a new standard for book reviews.

Each member of the ME – SIG will review a chapter of Marcia Ascher's book: Mathematics Elsewhere, with his or her colleagues and students and prepare a

"new wave" presentation for the NASGEm business meeting in San Antonio. The idea is to elaborate in a meaningful way upon significant ideas that may only be alluded to in typical reviews but which actually connect in some way with the ethnomathematics of the general reader. The SIG members will also publish and introductory monograph on their work. In this way, we may begin to impact mathematical reviews and popularize ethnomathematics as well.

The SIG members are: Cathy Barkley; Oshon Temple; Milton Bond; Ron Eglash; and Claudia Zaslavsky. Others are invited to join by contacting Gloria Gilmer by e-mail at Ggilmer@aol.com.

INTERNATIONAL STUDY GROUP ON ETHNOMATHEMATICS

International Board of Directors Meeting—6 August 2002—Ouro Preto, Brazil

MINUTES

The President, Paulus Gerdes, was unable to attend the Second International Congress of Ethnomathematics and hence was unavailable to chair the Board meeting. Lawrence Shirley, one of the three Vice-Presidents, presided.

The President shall appoint a Secretary for the Board. In the meantime, Shirley is recording minutes of this meeting.

For the immediate future, the Acting Treasurer of ISGEm shall be the Treasurer of the North American chapter (North American Study Group on Ethnomathematics—NASGEm), since the North American chapter has been operating the account for ISGEm. This Treasurer position is currently held by Cathy Barkley.

Having obtained acceptances from the nominees, the Board appointed Pedro Paulo Scandiuzzi as Editor of the ISGEm Newsletter, and Marcelo Borba as Assistant Editor. Both are from Brazil. (For reference, Scandiuzzi's e-mail address is pepe@edu.ibilce.unesp.br.) The Board thanked Tod Shockey, who has been interim Editor for the past several issues (He will continue as the Editor of the new NASGEm newsletter).

The Board delayed decision on a proposal for ISGEm to sponsor a scholarly journal of ethnomathematics, pending further discussion with the President and others who were unable to attend the meeting. However, the following were nominated as a preliminary editorial board: Bill Barton, Maria Luisa Oliveras, Franco Favilli, Daniel Orey, Rick Scott, Tod Shockey, and Maria do Carmo Domite.

The Board also delayed action on any amendments of the ISGEm Constitution, pending further discussion. Some of the suggested amendments relate to clarification of the separate roles of the overall ISGEm and the regional chapter.

The Board agreed that all who registered for the Second Congress would have automatic ISGEm membership until the next Congress.

Since the early 1990s, ISGEm has been an affiliate of the (American) National Council of Teachers of Mathematics (NCTM) organization. However, now that the North American chapter has been organized and handles ISGEm business in the region of the NCTM, the Board approved making effort to shift the affiliation with NCTM from ISGEm to the NASGEm.

The Board accepted the invitation from Bill Barton to hold the Third International Congress of Ethnomathematics in New Zealand. The conference will be in 2006, probably in January (summer season in New Zealand), though the exact dates will be announced later. A Program Chair and International Program Committee will be selected later.

The Board noted that the Tenth International Congress on Mathematical Education (ICME-10) will be held in Copenhagen, Denmark, in July, 2004. Bill Barton and Marcelo Borba are ISGEm members who are on the ICME International

Program Committee. They (and other ISGEm members) are asked to work for a good ethnomathematics presence at the Congress. However, it appears the Topic Group structure may be changed such that there is no specific group for ethnomathematics as there was in Japan at ICM-9.

Respectfully submitted,

Lawrence Shirley

Minutes from the ISGEm Board Meeting Monday, April 22, 02, 12 noon. Venetian Hotel

Present: Tim Crane, Marilyn Frankenstein, Gloria Gilmer, Swapna Mukhopadhyay, Daniel Orey, Larry Shirley, Tod Shockey, Rick Silverman, HollyWenger.

Committee on NASGEm Affiliation:

After exchanging initial pleasantries, the group focused discussion on establishing a committee for the North American chapter to take over from the International Study Group of Ethnomathematics as an affiliate of NCTM. The members of the committee are: Gloria Gilmer, Daniel Orey, and Larry Shirley. Rick Silverman made the motion and it passed unanimously.

New Journal:

Larry Shirley brought up the issue of a new journal and the group decided that there needs to be more discussion with the international group at the II-CIEM in Brazil in August. Since the North America group doesn't have any funds of its own, starting a journal could not be financially feasible. Tod Shockey thanked Jim Barta for his effort in having the newsletter printed in a journal-type format.

NASGEm Membership dues:

After some discussion, the revised annual dues for NASGEm is decided to be $20.00 for fully employed individuals. For students and less than fully employed individuals, the subscription rate is 50% discounted and is $10.00.The NASGEm dues will cover the ISGEm dues as well.

This motion passed unanimously too.

Constitution:

Larry Shirley will send the bylaws and constitution of ISGEm electronically to the board members.

Gloria Gilmer, on behalf of her committee, will reexamine the constitution and by-laws for NASGEm.

Certificate:

Gloria Gilmer handed over the certificate from NCTM to ISGEm to Larry Shirley.

New NCTM Rep

Rick Silverman was appointed as the new NCTM rep.

Acting Treasurer

As Jim Barta starts his sabbatical from Summer '02, Cathy Barkley agrees to take the position (she was contacted by telephone during the meeting). Marilyn Frankenstein suggests to start a new committee on financial affairs.

Gloria Gilmer recommends that NCTM be contacted for membership campaign.

There was substantial discussion re a retreat for the board members. Marilyn Frankenstein needs to be contacted re the retreat prior to the NCTM Regional in Boston in November, 02.

SIG coordinators: Gloria Gilmer will coordinate all four SIGs.

I. Curricula and classroom application—Tim Crane

II. Out of classroom application—Swapna Mukhopadhyay

III. Theoretical and epistemological considerations—no one

IV. Research in diverse environments—Daniel Orey

Tod Shockey: Editor of the newsletter for NASGEm
Daniel Orey: Co-editor of the newsletter for NASGEm.

Upcoming meetings:

NCTM 2003, San Antonio. Tod Shockey & Jim Barta submitted a proposal for the minicourse.

Larry Shirley announced the dates for other meetings.

Minutes

NASGEM Annual Business meeting
NCTM 2002
Las Vegas
Tuesday, April 23, 02, 7:00 PM

President Larry Shirley greeted the attendees and explained the switch over of name from ISGEM (International Study Group of Ethnomathematics) to NASGEm (North American Study Group of Ethnomathematics). Dr. Shirley strongly emphasized that NASGEm was not seceding from the parent organization ISGEM and will fully support them as their North American chapter,

SIGs (Special Interest groups) for the NASGEm

Gloria Glimer named as the coordinator of all the SIGs.

The SIGs and their corresponding coordinators were announced:

SIG Title Coordinator
1. Curriculum & Classroom applications
Tim Crane, Central Connecticut University

2. Out of School Application
Swapna Mukhopadhyay, San Diego State University

3. Theoretical and Epistemological Considerations, Vacant

4. Research in Cultural/Diverse Environments
Daniel Orey, California State University Sacramento

5. Ethnomathematics and the Arts
Marilyn Frankenstein, U Mass, Boston

Gloria Gilmer suggested launching study tours to increase interest and participation in ethnomathematics.

Tim Crane spoke about a course *Mathematics from Diverse Cultures* that he had taught from 1998 to 2000. This course satisfied the multicultural/international requirement for his institution. Currently conducting a survey on such courses, he shared his survey instrument with the attendees.

Marilyn Frankenstein described the role and goals of the new SIG, Ethnomathematics and arts. John Sims, one of the presenters at the mini-course, solicited support for his upcoming show. He also shared his idea of launching an annual publication (journal format) on Mathematical Art which would feature articles on ethnomathematics and would be published by Ringling College. His projected time line indicated first distribution of the journal in Fall 03. The journal would most likely focus on themes such as "representations in ethnomathematics.", "Pythagorean math and art".

For further information, John Sims could be contacted by email : jsims@rsad.edu

Upcoming meetings

II International Congress on Ethnomathematics, Aug. 5 - 7, in Ouro Preto, Brazil

Ubiratan D'Ambrosio invited everyone to attend the II International Congress on Ethnomathematics, Aug. 5 - 7, in Ouro Preto, Brazil. Since ethnomathematics is

studied widely in Brazil and a bulk of research on ethnomathematics is conducted there, this conference would be most suitable to attend for an interest in the subject. Larry Shirley reminded the participants that one could still submit a proposal for a poster presentation since the dead line was extended.

For the benefit of a wider audience, Gloria Gilmer requested to have the non-English papers translated in English.

She also invited the attendees to contribute their thoughts and ideas for the NASGEm newsletter.

Larry Shirley offered his email as a central hub or locator for future email communications.

Marilyn Frankenstein suggested to use the ISGEm list as a place for discussions on poster presentations and other similar ideas.

NCTM 2003, San Antonio, TX, April, 03.

NCTM allows the group one three-hour mini-course at the annual meeting.

A proposal for a mini-course on curriculum development for K - 16 had been submitted by Daniel Orey, Jim Barta and Tod Shockey.

NCTM 2004, Philadelphia, PA, April, 04.

If interested in submitting a proposal for the mini-course, Larry Shirley should be contacted.

ICME Copenhagen, July 04

The website ? A topic group on ethnomathematics needs to be launched.

III. ICEM, 2006

Possibility of hosting the meeting in US?

Delegate Assembly

Rick Silverman agreed to serve as the NCTM Representative and to attend the 2003 Delegate Assembly in that capacity.

Switching to NASGEM from ISGEm

The new "name" indicated strengthening of the North American chapter. New constitution need to be developed.

Membership dues

$20 annual membership dues for NASGEm. The committee at the international conference will decide on the dues structure.

One of the attendees suggested to think about the nonprofit status for the group.

Vacancies

Two vacancies in the office:

(1) Treasurer, although Cathy Barkley agreed to be the acting treasurer.

(2) NCTM rep. Anyone interested should contact Larry Shirley at lshirley@towson.edu.

Treasurer's report

Jim Barta shared his report as the ISGEm treasurer.

Since roughly 80% of the total membership is from the US, Tim Crane suggested that NASGEm take the responsibility for carrying the financial burden of the newsletter for the non-US members. One of the attendees (Jack London) urged the group to think in terms of electronic publishing. Larry Shirley invited suggestions from the group.

During the last part of the meeting, the participants introduced themselves and shared their personal interest in ethnomathematics.

Meeting adjourned at 8:30 PM.

Respectfully submitted

Swapna Mukhopadhyay

ISGEm CONSTITUTION

Article I. Name.

The name of this organization shall be the International Study Group on Ethnomatematics (ISGEm).

Article II. Purpose.

The purpose of the organization shall be to encourage and maintain interest in the teaching and learning of mathematics in cultural contexts and to promote professional growth, fellowship and communication among its members.

Article III. Membership.

Section 1. Membership shall be open to all persons interested in ethnomathematics.

Section 2. (A) Members shall pay regular dues and be entitled to all privileges of the organization. (B) The dues shall be set by the Executive Board subject to approval of the membership. (C) At the discretion of the Executive Board, any person shall be granted an honorary membership upon request without payment of dues.

Section 3. The membership period coincides with the calendar year from January 1 to December 31.

Section 4. All members shall indicate the region to which they belong. The regions shall be: A. Africa; B. Asia (including the Middle East); C. South Pacific (including Australia, New Zealand and the Pacific Islands); D. Europe; E. The Americas (North, Central, South, and the Caribbean).

Article IV. Executive Board.

Section 1. The Executive Board shall consist of the officers and members-at-large, lthe NCTM representative, the editor of the newsletter, the immediate Past-President, the President-Elect, the Program Assistant and the Assistant Editor.

Section 2. The Executive Board shall attend to any business of the organization that may require attention in the interval between business meetings.

Article V. Officers.

The officers of the organization shall be President, First Vice-President, Second Vice-President, Third Vice-President, Recording Secretary, Corresponding Secretary and Treasurer.

Article VI. Duties and Election of Officers.

Section 1. The President shall preside at all meetings of the organization and shall be chairman, ex-officio, of the Executive Board, and shall appoint an NCTM representative, the editor of the newsletter and the Assistant Editor.

Section 2. The First Vice-President shall perform the duties of the President in the absence of the President and shall act as program chairman. The First Vice-President shall appoint as necessary a program committee and a Program Assistant or specify program representatives to promote presentations on Ethno-Mathematics at relevant professional meetings.

Section 3. The Second Vice-President shall perform the duties of the President in the absence of the President and the First Vice-President and shall act as membership officer.

Section 4. The Third Vice-President shall perform the duties of the President in the absence of the President, the First Vice-President and the Second Vice-President and shall act as coordinator of the Special Interest Groups (SIGs) in ISGEm and communicated with members-at-large concerning

conferences relevant to ISGEm in their respective regions.

Section 5. The Secretary shall keep the minutes of the business meetings and shall pass these along to the newly elected secretary as a permanent record of the actions of the organization.

Section 6. The Treasurer shall receive and account for all monies of the organization, disburse all sums on order of the President, and render a financial report at the last meeting of the year. A yearly audit must be conducted by two members appointed by the Executive Board.

Article VII. Meetings.

At least one business meeting shall be held during each calendar year. The time and place of these meetings shall be set by the Executive Board. All meetings are open to any member of the Group.

Article VIII. Rules of Order.

The organization shall be governed by Robert's Rules of Order except in matters otherwise provided for by the Constitution.

Article IX. Amendments.

This Constitution may be amended at any meeting of the Group by a two-thirds majority vote of the members present and voting, provided notice of the proposed amendment has been given at the previous meeting.

Article X. Dissolution.

If at any time the International Study Group on Ethnomathematics (ISGEm) shall cease to carry out the purposes herein stated, all assets held by it in trust or otherwise, shall, after the payment of its liabilities, be paid over to an organization selected by the final Executive Board of the International Study Group on Ethnomathematics which has similar purposes and has established its tax-exempt status under Section 501 (c) (3) of the Internal Revenue Code of 1954 as now enacted or hereafter amended, and such assets shall be applied exclusively for such charitable, scientific, and educational programs.

By-Laws

Article I. Executive Board.

Section 1. Two of the members-at-large shall be elected from the South Pacific, three from Africa, three from Europe, three from Asia (including the Middle East), and three from the Americas.

Section 2. Additional members of the Executive Board shall include the Immediate Past-President, the President-Elect, the NCTM Representative, the Editor of the newsletter, the Assistant Editor, the Program Assistant, and the officers.

Article II. Election of Officers and Members-At-Large.

Section 1. The terms of office for all officers and members-at-large shall be four years with half the members-at-large elected every two years.

Section 2. All elections shall be held by ballot prior to the end of each even-numbered calendar year and shall be carried by a plurality vote of the ballots returned. Nominations for the officers and members-at-large shall be made by a Nominating Committee of five members, appointed by the President and approved by the Executive Board. The Nominating Committee shall recommend at least one candidate for each office to be filled. Other nominations shall be received as write-ins on the election ballot at the time of the election. The consent of each candidate, other than write-ins, must be obtained before the name is placed in nomination.

Section 3. Officers shall be elected in years divisible by four.

Section 4. Officers shall begin to serve two years after being elected.

Section 5. Members-at-large shall begin to serve on January 1 of the odd-numbered year immediately following election.

Section 6. Officers shall be elected by the entire membership.

Section 7. Members-at-large shall be elected by the members from their region.

Section 8. All officers and members-at-large can be re-elected.

Article III. Amendments.

These by-laws may be amended by written ballot by a majority vote of the ballots returned, provided notice of the proposed amendment has been given at the previous meeting.

First Amendment

In order to broaden the membership in the International Study Group on Ethnomathematics (ISGEm) and increase the participation in research in ETHNOMATHEMATICS around the world, the following provisions are permitted:

1. ISGEm chapters may established in each region delineated in this constitution, Article III, Section 4, or in countries within those regions, for the purposes of furthering the aims of ISGEm. Each chapter so formed must adopt an organizational structure parallel to the structure of ISGEm.

2. Each chapter created under the auspices of this amendment must abide by this constitution. Furthermore, all members and officers of each chapter must be members of that chapter or members at large of ISGEm.

3. Each chapter is permitted to set its own membership dues structure according to its own socio-economic conditions. The President of the chapter must communicate to the President, or to the Second Vice President, of ISGEm the membership policies governing each chapter.

ISGEm-NA CONSTITUTION

Article I. Name.

The name of this organization shall be the International Study Group on Ethnomatematics-North America Chapter (ISGEm-NA).

Article II. Purpose.

The purpose of the organization shall be to work in close collaboration with ISGEm to encourage and maintain interest in the teaching and learning of mathematics in cultural contexts and to promote professional growth, fellowship and communication among its members. ISGEm-NA shall be subordinate to ISGEm and its constitution on matters petaining to activities sactioned by this constitution.

Article III. Membership.

Section 1. Membership shall be open to all persons interested in ethnomathematics.

Section 2. (A) Members shall pay regular dues and be entitled to all privileges of the organization.

(B) The dues shall be set by the Executive Board subject to approval of the membership.

(C) At the discretion of the Executive Board, any person shall be granted an honorary membership upon request without payment of dues.

Section 3. The membership period coincides with the calendar year from January 1 to December 31.

Section 4. All members shall indicate the region to which they belong. The regions shall be: A. Canada; B. Mexico; C. United States of North America.

Article IV. Executive Board.

Section 1. The Executive Board shall consist of the officers and members-at-large, the NCTM representative, the Editor of the Newsletter, the immediate Past-President, the President-Elect, the Program Assistant, and the Assistant Editor.

Section 2. The Executive Board shall attend to any business of the organization that may require attention in the interval between business meetings.

Article V. Officers.

The officers of the organization shall be President, First Vice-President, Second Vice-President, Third Vice-President, Recording Secretary, Corresponding Secretary and Treasurer.

Article VI. Duties and Election of Officers.

Section 1. The President shall preside at all meetings of the organization and shall be chairman, ex-officio, of the Executive Board, and shall appoint an NCTM representative, the Editor of the Newsletter, and the Assistant Editor.

Section 2. The First Vice-President shall perform the duties of the President in the absence of the President, and shall act as program chairman. The First Vice-President shall appoint as necessary a program committee and a Program Assistant or specify program representatives to promote presentations on Ethno-Mathematics at relevant professional meetings in North America and elsewhere.

Section 3. The Second Vice-President shall perform the duties of the President in the absence of the President and the First Vice-President and shall act as membership officer.

Section 4. The Third Vice-President shall perform the duties of the President in the absence of the President, the First Vice-President and the Second Vice-President and shall act as coordinator of the Special Interest Groups (SIGs) in ISGEm-NA and communicate with members-at-large concerning conferences relevant to ISGEm-NA in their respective regions.

Section 5. The Secretary shall keep the minutes of the business meetings and shall pass these along to the newly elected secretary as a permanent record of the actions of the organization.

Section 6. The Treasurer shall receive and account for all monies of the organization, disburse all sums on order of the President, and render a financial report at the last meeting of the year. A yearly audit must be conducted by two members appointed by the Executive Board.

Article VII. Meetings.

At least one business meeting shall be held during each calendar year. The time and place of these meetings shall be set by the Executive Board. All meetings are open to any member of the Group.

Article VIII. Rules of Order.

The organization shall be governed by Robert's Rules of Order except in matters otherwise provided for by the Constitution.

Article IX. Amendments.

This Constitution may be amended at any meeting of the Group by a two-thirds majority vote of the members present and voting,

provided notice of the proposed amendment has been given at the previous meeting.

Article X. Dissolution.

If at any time the International Study Group on Ethnomathematics (ISGEm) shall cease to carry out the purposes herein stated, all assets held by it in trust or otherwise, shall, after the payment of its liabilities, be paid over to an organization selected by the final Executive Board of the International Study Group on Ethnomathematics which has similar purposes and has established its tax-exempt status under Section 501 (c) (3) of the Internal Revenue Code of 1954 as now enacted or hereafter amended, and such assets shall be applied exclusively for such charitable, scientific, and educational programs.

By-Laws

Article I. Executive Board.

Section 1. One of the members-at-large shall be elected from each of the following regions: (a) Canada; and (b) Mexico.

Section 2. Additional members of the Executive Board shall include the Immediate Past-President, the President-Elect, the NCTM Representative, the Editor of the Newsletter, the Assistant Editor, the Program Assistant, and the officers.

Article II. Election of Officers and Members-At-Large.

Section 1. The terms of office for all officers and members-at-large shall be two years.

Section 2. All elections shall be held by ballot at a regular meeting of ISGEm-NA and shall be carried by a plurality vote of the ballots returned. Nominations for the officers and members-at-large shall be made by a Nominating Committee of five members, appointed by the President and approved by the Executive Board. The Nominating Committee shall recommend at least one candidate for each office to be filled. Other nominations shall be received as write-ins on the election ballot at the time of the election. The consent of each candidate, other than write-ins, must be obtained before the name is placed in nomination.

Section 3. Members-at-large shall begin to serve on January 1 of the year immediately following election.

Section 4. Officers shall be elected by the entire membership.

Section 5. Members-at-large shall be elected by the members from their region.

Section 6. All officers and members-at-large can be re-elected.

Article III. Amendments.

These by-laws may be amended by written ballot by a majority vote of the ballots returned, provided notice of the proposed amendment has been given at the previous meeting.

NASGEm 2003 Elections

Elections for the slate of proposed officers will occur at the Annual Meeting of the National Council of Teachers of Mathematics being held in San Antonio, Texas, 09 – 12 April 2003.

FINAL SLATE of NASGEm OFFICERS for 2003-2005

Larry Shirley
Office -President
Affiliation - Professor of Mathematics and Associate Dean of the College of Graduate Education and Research, Towson University
NASGEm Activities - President 2000-2002; USA Member ICEM-II International Program Committee; Coordinator of ICEM-II Roundtable on Ethnomathematics and Teacher's Qualification
Vision for NASGEM - To strengthen NASGEm's affiliation with NCTM and ISGEm

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Arthur Powell
Office - 1st Vice-president (Program Chair) -
Affiliation - Professor, Mathematics Education, Rutgers University
NASGEm Activities - 1st Vice-President 2000-2002; USA Member ICEM-II International Program Committee; Coordinator of ICEM-II Roundtable on Ethnomathematics and Urban Education; ICEM-II Conference
Lecturer on Paulo Freire's Contribution to an Epistomology of Ethnomathematics
Vision for NASGEm for next two years - To Increase NASGEm's visibility at conferences

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Louise Gould
Office - 2nd Vice President (Membership Officer)
Affiliation - Professor in Department of Mathematical Sciences, Central Connecticut State University, New Britain CT
NASGEm Activities - Presentation / Roundtable V: Ethnomathematics and Teacher's qualification Use of Ethnomathematics Topics in North American College Programs at ICEM-II.
Vision for NASGEm for next two years - To bring increased visibility to NASGEm through the NCTM affiliation and conference related presentations, and build a resource base for educators of pre-service teachers and wage a vigorous campaign to increase memberships in Mexico, Canada, and the USA

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Gloria F. Gilmer
Office - 3rd Vice-president (SIG Coordinator)
Affiliation - Math Curriculum Consultant, Math - Tech Milwaukee
NASGEm Activities - 3rd Vice- President 2000-2003; USA Member ICEM-II International Program Committee; ICEM-II Closing Speaker
Vision for NASGEm for next two years - To create at least four strong SIGs that research and publish their findings on ethnomathematical issues in North America

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Holly Wenger
Office - Recording Secretary
Affiliation: Mathematics Teacher, 9-12 public school, Sacramento, CA
NASGEm Activities: member, participant since ICEM-1 in Granada. Occasional presenter at local functions in behalf of ethnomathematics study and usage in K-12
Vision for NASGEm: strengthen NASGEm's presence among K-12 classroom teachers; encouraging dialog and contact among teachers who wish to use an ethnomathematical perspective in their daily work with kids.

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Claudette Bradley -
Office - Corresponding Secretary
Affiliation - Professor, University of Alaska - Fairbanks
NASGEm Activities -
Vision for NASGEm for next two years - To disseminate updated rosters and constitutions to all members and to e-mail quarterly NASGEm news alerts to all members,

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Cathy Barkley
Office - Treasurer
Affiliation - Professor of Mathematics, Mesa State College
NASGEm Activities - Treasurer 2002
Vision for NASGEm for next two years: To remind all members to pay dues annually

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Office - Members-at-large
Marilyn Frankenstein
Affiliation - Professor College of Public and Community Service, University of Massachusetts - Boston
NASGEm Activities - Member-at-Large 2000-2002; Coordinator for the Math and Arts SIG; Organizer of NASGEm Mini Course in Las Vegas in 2002; ICEM-II Conference Lecturer on Paulo Freire's Contribution to an Epistomology of Ethnomathematics
Vision for NASGEm for next two years - To strengthen the Math and Arts SIG and to help strengthen the organizational structure of the group

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Oshon Temple
Affiliation - Mathematics Teacher, De La Salle Academy, Manhattan, New York
NASGEm Activities - Presentation at ICME-II with Arthur Powell. "Bridging Past and Present: Ethnomathematics, The Ahmose Mathematics Papyrus, and Urban Students." II International Congress on Ethnomathematics. Ouro Preto, Brazil, 7 August 2002; Presentation at 78th Annual Meeting of the National Council of Teachers of Mathematics. Chicago, USA, 14 April 2000 with Arthur Powell on "Ethnomathematics: Examples and Justification of Curricular Modules."
Vision for NASGEm for next two years - To work to maintain and increase relationships with young teachers as a means of sustaining and growing membership in NASGem and to serve as a Portuguese and Spanish translator.

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Patrick Scott
Affiliation - Associate Dean, College of Education, New Mexico State University
NASGEm Activities - As past Editor (1985-1998) of ISGEm Newsletter have maintained availibility of past ISGEm publications ; Attended ICEM-II.
Vision for NASGEm for next two years - Advance knowledge of and use of ethnomathematics in math courses at all levels.

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Note: ICEM - II is the Second International Congress on Ethnomathematics held 5-7 August 2002 in Ouro Preto, Minas Gerais, Brazil

Interested in Math and the Arts?

See the preliminary edition of MATH DANCE by Karl Schaffer, Erik Stern and Scott Kim. For more information visit their website http://www.mathdancs.org or e-mail Karl at schafferkarl@fhda.edu . Please consider signing up for the Math and Art SIG, send Gloria Gilmer an e-mail at Ggilmer@aol.com to get signed up

NASGEm Newsletter Submissions

It is up to YOU to make this newsletter a success. We want to be informed about your research, publications, grant work, teaching, and what your undergraduate and graduate students are doing. Please send your input electronically to:

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OR TO:

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Professor
Mathematics and Multicultural Education
College of Education
California State University, Sacramento
6000 J Street
Sacramento, CA 95819 - 6079

Special Interest Groups (SIGs) for the NASGEm

Chaired by Gloria Gilmer, Ggilmer@aol.com

SIG Title Coordinator
Curriculum & Classroom Applications
Tim Crane
Central Connecticut University
crainet@mail.ccsu.edu

Out of School Applications

Swapna Mukhopadhyay
Portland State University
swapna@pdx.edu

Theoretical & Epistemological Considerations

Vacant

Research in Culture/Diverse Environments

Daniel Orey
California State – Sacramento
orey@csus.edu

Ethnomathematics and the Arts

Marilyn Frankenstein
U Mass – Boston
marilyn.frankenstein@umb.edu

Become an NASGEm/ISGEm member !

Dues for the International Study Group on Ethnomathematics are $15 per year and may be paid for up to three years. Contributions may be made in order to allow others to receive the ISGEm Newsletter. Please fill out the form below and mail it along with a check to Dr. Cathy Barkley, Department of Computer Science, Mathematics & Statistics, Mesa State College 1100 North Ave., Grand Junction, CO 81501, USA. Make checks payable to ISGEm.

name _____

address _____

city _____ **state/province** _____ **postal code** _____

country _____

phone _____ **e-mail** _____

amount enclosed _____

may your name/address be distributed to organizations that request copies of the ISGEm mailing list? _____ **yes** ___ **no**

please briefly describe any projects in which you are involved that may be related to ethnomathematics.