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Introductory Chemistry Course

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to the data base concept was so well received by state officials, forest industry, regional planners and researchers that the original concept of the data base has been broadened to include information on the total forest ecosystem, including wildlife and other forest based resources. The system is now operational and data processing and research work has begun at Monticello.

Existing sources of forest information were first investigated to determine what data were available. No single source of information could provide all of the information that was desired in the Monticello data base. However, the information that could be provided, in concert, did meet the initial needs of the project. A brief description of the data and the identified sources follows.

The U.S. Forest Service (USFS) has 3200 permanent forest inventory plots located in Arkansas. These plots are resampled on a ten year cycle. The information from the plots include 98 different variables, including the volume of growing stock, growth rates of the trees on the plots, ownership class, and changes in land use of the plot. The information in published U.S. Forest Service analyses has for many years provided foresters in the state with information about the nature of the forest resource, the expected changes in the forest over the next cycle and an index to the total health of the resource. One problem with the Forest Service Survey however, is the long cycle period. Because of rapidly changing land use, changes in forest products markets and industrial shifts within the state, this information quickly becomes dated. A mid-cycle survey of 10% of the plots is conducted to ease the problems of the long cycle. However, the information from this sample is not as detailed as the full survey. Supplementary information is needed to aid in interpretation of the USFS information. The forest survey information for the last full cycle survey, and the mid-cycle survey just completed will be brought to Monticello and put in our data banks.

Supplementing and complementing the forest survey information will be information from the Arkansas Forestry Commission (AFC) in Little Rock. The State Forester has agreed to provide us with regeneration, harvest, wildlife and industrial production information for the state from their files. The addition of this information to the data base at Monticello will help to complete the picture of forest growth, removals and industry activity within the state. Reports for regions and sub-regions within the state, with information available down to county level can be developed with these additions to the data base.

Information on wildlife populations and dynamics will be obtained from the Arkansas Game and Fish Commission (AGFC) and the U.S. Fish and Wildlife Service. This will include information on herd movements, estimated herd densities and changes in the wildlife base due to changes in land use, hunting pressure and changes due to forest habitat manipulation.

A major bank of information has been collected by the Arkansas Economic Information System (AEIS) located at the University of Arkansas at Little Rock. Researchers there have for several years been amassing data that describes the total economy of the state. Included in their data is information that describes the general health of the work force, wage, employment, earnings, and productivity by industry. The information pertaining directly to the forest sector is of greatest importance to this project. Using their information, in conjunction with the forest descriptive information, the total forest sector of the state can be modeled. A model of this type will describe not only the forest resource, but also the effect that the dynamic forest sector has on the total economy of the state.

Much of the health of the forest sector is directly related to national and international markets for forest products. Prices, demand and supply projections form the basis of much of the econometric modeling that is carried on by forest industry planners. Access to regional and state stumpage price information for a considerable period of will be included to extend our data base. National marketing information is available and will complement the state level data that have already been recovered.

As we become aware of other information, we will attempt to incorporate it into the system at Monticello. We feel that only by having all of the information about the forest based resources at one place can we paint the total picture as it exists.

The initial statistical reports from the data base will be primarily of a descriptive nature. Summary statistics describing the forest resource, by location within the state should be produced within the next year. Later, summary reports will be produced for each of the major regions of the state and subregions of specific interest. We will also be able to handle requests for data from other researchers around the state. The information that we have will be available to all who desire it, limited only by our total work load. The first report of summary statistics should be completed by late 1986 and include the updated forest survey information, the status of the forest products industry within the state and growth projections for the next few years. Certain wildlife information will also be included in the report.

One of the principal concepts behind assembling the data base was to provide a basis for long term research within the state. Charting the dynamic character of the forest resources of the state will, by its very nature, take time. Cross-sectional data alone does not provide the ability to view the changes that occur over time in our resource base. Consequently, we will update the time series information to complement the periodic cross sectional views that we gain from the forest surveys and updates. Modeling the changes in the forest resource over time will give us the ability to not only accurately describe the past but to be predictive about the future.

Within a year we will be developing the first of the forest resource models, including those factors that we believe are important. For example there is considerable interest in the development of a stumpage prediction model for the state. A second, and related model will address the growth-drain patterns of timber within the state. Other models have been suggested and as time permits they will be investigated.

Because of the tremendous volume of data that will be located at Monticello, it is natural to make available as much information, in the most usable format, to the greatest number of people. Contract research, looking at relatively narrowly defined problems, is a service that we will be equipped to provide. The details of this type research have not yet been worked out, but the concept has been discussed.

Clearly, the data base as described is macro in scale and design. The information, statistics, and research flowing from it, will provide researchers with new opportunities to better understand the forest ecosystem that is such an important part of our state. The data base will be a resource data pool for any who desire to use it. Participation in this project by any cooperators is welcomed. The computer capability and the expertise is present to store, retrieve, merge and sort data from any different sources. However, in order to reach its true potential as a research and scientific resource, others should be included in the work that has been started. To this end, we are seeking your help and guidance on what additional information should be included in the data base. We are open to discussing participation in this project with other researchers, interested groups and cooperators within the state.

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AN INTRODUCTORY CHEMISTRY COURSE

The Department of Chemistry at Arkansas State University teaches general chemistry to over 400 non-chemistry majors each year. The range of academic preparation in the physical sciences of these students is very broad because the university has an open admissions policy. Consequently, general chemistry is presented assuming that the student has had little exposure to the study of chemistry.

As a neophyte instructor in 1964, the author was informed that the mathematical ability of the student was the best indicator of success in chemistry. Studies of the (former) chairman indicated that high school chemistry had little impact on a student's ability to cope with general chemistry. This conclusion was compatible with that mentioned by Schelar, Cluff, and Roth (Schelar, Cluff, and Roth, J. Chem. Ed., 40,No.7:369-370, 1963). However, it is quite probable that our present day students cannot be so categorized.

Starting in 1964, all agriculture students were required to take general chemistry in the chemistry department at Arkansas State University. In the intervening years, the introduction of new majors within the university swelled the growth of the chemistry department disproportionately to the growth of the university. Approximately one third of the students enrolled in general chemistry have had no high school chemistry. Two thirds of this group consists of agriculture or nursing majors. Unfortunately, it has become apparent that the expansion of D, F, and W grades has outstripped the growth of the student population.

"I had to fail Chem I. I did not take chemistry in high school so I had to flunk. Now that I have done this, I will pass this time." That remark, overheard by chance, seems to sum up the attitude of an increasing number of students. This particular student was wrong on both counts, but she believed it — so did her companions.

McQuary, Williams, and Willard (McQuary, Williams, and Willard, J. Chem. Ed., 29,No.9:460-464, 1952) studied the factors that determine student achievement in first year college chemistry. One of their conclusions was that students who have had chemistry in high school are as a group superior to students who have not had high school chemistry. Rowe (Rowe, J. Chem. Ed., 60,No.11:954-956, 1983) points out that chemistry students must assimilate over 6,000 units of information, which is more than is required in the first year study of a foreign language. In addition, word meanings are new in chemistry. The work of Hadley, Scott, and Van Lente (Hadley, Scott, and Van Lente, J. Chem. Ed., 30,No.6:311-313, 1953) led to the observation that students who had high school chemistry, irrespective of other courses, made better records in chemistry than those who did not have high school chemistry.

First semester general chemistry sections were surveyed during the fall terms of 1981, 1982, and 1983. From a total of 789 students, 273 (34.6%) had not taken chemistry in high school. This group accounted for 51% of the D, F, and W grades and only 11.4% of the A and B grades. From another perspective, 196 of 273 students (71.8%) with no high school chemistry received a grade of less than C. From the 516 students who had taken high school chemistry, 188 (36.4%) received a grade of less than C.

A grade of D is passing at ASU. However, it is equivalent to failing for many majors. Prepharmacy students transfer after two years at ASU; a D is non-transferable. BSN nursing majors must have a C average in two chemistry courses and one zoology course. Medical technology majors must have a C average for admission into the final year of that program. Most health science majors will repeat chemistry if their grade is less than C. Therefore, D, F, and W grades were combined for the purpose of this paper.

The data for 1981 indicated that a significant number of students could be helped by some introduction to chemistry prior to their enrollment in the regular college chemistry course. Topics such as the metric system, exponential arithmetic, significant figures, etc., are routinely introduced in the first chapter of many college texts. The student acquainted with these topics from high school chemistry would have an advantage (real or imagined) over a student with no such acquaintance.

A survey of high school chemistry teachers in 1985 (Hammett, Incomplete M.S. Thesis, Arkansas State University) supports this idea. The metric system is taught by 172 respondents and 108 indicated that their students have difficulty with this subject. Likewise, 81 of 164 who teach exponents report deficiencies in this area. Since 83 percent of these teachers rank the bulk of their students in the top 25 percent of their classes, it is not unreasonable to assume that a greater percentage of students with no high school chemistry would have difficulty with these and other math topics covered in the first chapter of most college chemistry texts.

Chemistry 16003, Introduction to Inorganic Chemistry, was offered as a three hour lecture course during the fall term of 1982. The course was a true elective since it would not substitute for the physical science requirement. Advisors were requested to suggest that any student with no high school chemistry consider enrolling in this course, particularly if they were not proficient in algebra. Arrangements were made with the registrar to permit students having difficulty in the regular chemistry course to transfer into CHEM 16003 through the sixth week of school.

CHEM 16003 was initially offered at 10:00 a.m., MWF. The enrollment was small, and only four students managed to drop back into the course. Several others could not do so because of conflicts with other courses. In the fall of 1983 the course was offered at 2:00 p.m., MW. The non-prime time scheduling attracted an initial 22 students. By the end of the fifth week, enrollment had swelled to 42 due to the drop-back option.

Isolated from students with some acquaintance with chemistry, a CHEM 16003 class makes a stark contrast with a regular chemistry class. In general the students are poorly motivated, have bad study habits, are very hesitant in asking questions, and are slow to participate in any type of classroom exercise. With encouragement, some have made excellent efforts to overcome their deficiencies. The metamorphosis of these latter made the program rewarding to the instructors.

The author is under no illusions about the late transfer of (probably) failing students into the introductory course. Only a small fraction give evidence of making a significant effort to succeed.

To date, 47 students have passed CHEM 16003 and enrolled in the regular chemistry course at ASU. Twenty-seven of these subsequently passed. Thirteen of those who failed or withdrew earned only a D in CHEM 16003.

The student response to the introductory course has been positive. Those who have continued into the regular chemistry course have been emphatic in their affirmation of the worth of the course.

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INTERSPECIFIC CORRELATIONS OF HARVEST AND PRICE FOR ARKANSAS FURBEARERS: A CAUTIONARY NOTE

As part of a continuing analysis of Arkansas fur harvest records (Heidt et al., 1984; Heidt et al., 1985; Peck et al., 1985; Clark et al., 1985; and Peck and Heidt, 1985), this study investigated interspecific correlations of season length, harvest, and price as variables for fur harvest analysis of 12 Arkansas fur bearers (coyote - *Canis latrans,* muskrat - *Ondatra zibethicus,* river otter - *Lutra canadensis,* nutria - *Myocastor coypus,* mink - *Mustela vison,* eastern spotted skunk - *Spilogale putorius,* striped skunk - *Mephitis mephitis,* beaver - *Castor canadensis,* opossum - *Didelphis virginiana,* gray fox - *Urocyon cinereoargenteus,* raccoon - *Procyon lotor,* bobcat - *Felis rufus*).

The Arkansas Game and Fish Commission has maintained fur harvest records since 1939; because of the relative completeness and accuracy, records for the past 20 seasons (1965-1984) were used for this study (Peck and Heidt, 1985). Season length and total numbers of each species harvested