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Manuscripts and inquiries about publication and information about advertising should be sent to the editor: Kenneth J. Curry, University of Southern Mississippi, Post Office Box 5018, Hattiesburg, MS 39406-5018.
601-266-4930 (voice & fax)
kenneth.curry@usm.edu.

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Election results are in and congratulations are in order for new President Elect Margo Hall and new Board Director Clifford Ochs. The gavel changed hands in July from Susan Nodurft who becomes our immediate past president to Bill Lushbaugh who is our current president (see his introductory remarks in this issue).

This Academy has a strong and increasing presence on the national scene through affiliation with the American Association for the Advancement of Science and National Association of Academies of Sciences. Our representative, Steve Case, has published a report in this issue outlining the hierarchy within these organizations which should help you to understand what they do and how we interact with them. You can also learn about our affiliations from the report by Dudley Peeler posted on our website at http://www.msacad.org/naasrep.html.

We have continued searching for ways to increase visibility and utility of this journal through identifying abstracting services. The main service that puts abstracts of this journal, including the annual meeting abstracts, into a searchable database is AcadSci, a nonprofit organization abstracting state academy journals. A general letter inviting you to see and search their database is published in this issue. Also please see their advertisement encouraging your libraries to subscribe to their service.

The annual meeting of the Mississippi Academy of Sciences will be held in Tupelo, Mississippi, next year on the 8th and 9th of February. This issue contains the final call for abstracts. Visit the Academy website to submit your abstract electronically. The deadline is 1 November.

Information about lodging and about new and renewal membership will be mailed to current members in December. This is an opportunity for you to encourage scientists new to our state to join the Academy and present their work at our annual meeting. This is also the time to be thinking about organizing the data you intend to present at the annual meeting into a written manuscript to publish in this journal.—Ken Curry

[insert Ohause advertisment here.]

To the Members of the Mississippi Academy of Sciences:

Important information is included in this communication that should be of special interest to those members of the Mississippi Academy of Science who have concerns about the low use of State Academy of Science journals by researchers. I am sure that through service to your academy you are well aware of the problems State Academies of Science have struggled with over the years in gaining acceptance of their published papers by researchers. In an attempt to find solutions to these problems, the State Academies of Science of the U.S. (with the exception of the N.Y. Academy of Science) have contributed in a variety of ways since 1994 to the development of State Academies of Science Abstracts (SASA). This online indexing/abstracting service takes in all science disciplines. Both annual meeting abstracts and abstracts of full-length papers are included. The Journal Mississippi Academy of Science is indexed/abstracted for the years 1985–present in SASA.

In states where this online indexing/abstracting service has been used for several years, State Academy of Science journals have come into very active usage by researchers. As SASA serves State Academies of Science exclusively, the researcher quickly becomes familiar with both journals and academies. SASA also provides links to all academies that have Web sites. The potential benefits include increased interest in academy membership, higher numbers of submitted manuscripts, and a better library market for academy journals. It is hoped that your institution takes advantage of this easy way to increase the visibility of the Journal Mississippi Academy of Science at no cost to the academy.

The trial version of SASA is currently available for use at no charge. It can be accessed at:

http://acadsci.marshall.edu:8765/
user name–acadsci
Password–summer2000

The above password will be valid through December 2000. The trial version of SASA is updated annually while the production version is updated every 40 days. If an additional trial period is needed after December 31, 2000, the new password should be requested.

It is also hoped that you will find SASA to be useful in your work and that you will recommend that your library initiate a subscription for this low-cost online database. Please feel free to contact me if you have questions.

Tom Weaks
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Architecture as Pedagogy[1]

David W. Orr[2]
Environmental Studies Center, Oberlin College, Oberlin, Ohio 44074

"The worst thing we can do to our children is to convince them that ugliness is normal."—Rene Dubos

As commonly practiced, education has little to do with its specific setting or locality. The typical campus is regarded mostly as a place where learning occurs, but is, itself, believed to be the source of no useful learning. It is intended, rather, to be convenient, efficient, or esthetically pleasing, but not instructional. It neither requires nor facilitates competence or mindfulness. By that standard, the same education could happen as well in California or in Kazakhstan, or on Mars, for that matter. The same could be said of the buildings and landscape that make up a college campus (Orr, 1993). The design of buildings and landscape is thought to have little or nothing to do with the process of learning or the quality of scholarship that occurs in a particular place. In fact buildings and landscape reflect a hidden curriculum that powerfully influences the learning process.

The curriculum embedded in any building instructs as fully and as powerfully as any course taught in it. Most of my classes, for example, are taught in a building that I think Descartes would have liked. It is a building with lots of squareness and straight lines. There is nothing whatsoever that reflects its locality in northeast Ohio in what had once been a vast forested wetland (Sherman, 1996). How it is cooled, heated, and lighted and at what true cost to the world is a mystery to its occupants. It offers no clue about the origins of the materials used to build it. It tells no story. With only minor modifications it could be converted to use as a factory or prison. When classes are over, students seldom linger for long. The building resonates with no part of our biology, evolutionary experience, or esthetic sensibilities. It reflects no understanding of ecology or ecological processes. It is intended to be functional, efficient, minimally offensive and little more. What else does it do?

First, it tells its users that locality, knowing where they are, is unimportant. To be sure, this is not said in so many words anywhere in this or any other building. Rather, it is said tacitly throughout the entire building. Second, because it uses energy wastefully, the building tells its users that energy is cheap and abundant and can be squandered with no thought for the morrow. Third, nowhere in the building do students learn about the materials used in its construction or who was downwind or downstream from the wells, mines, forests, and manufacturing facilities where those materials originated or where they eventually will be discarded. And the lesson learned is mindlessness, which is to say it teaches that disconnectedness is normal. And try as one might to teach that we are implicated in the larger enterprise of life, standard architectural design mostly conveys other lessons. There is often a miscalibration between what is taught in classes and the way buildings actually work. Buildings are provisioned with energy, materials, and water, and dispose of their waste in ways that say to students that the world is linear and that we are no part of the larger web of life. Finally, there is no apparent connection in this or any other building on campus to the larger set of issues having to do with climatic change, biotic impoverishment, and the unraveling of the fabric of life on earth. Students begin to suspect, I think, that those issues are unreal or that they are unsolvable in any practical way, or that they occur somewhere else.

Through the design buildings and entire campuses is it possible to teach our students that our ecological problems are solvable and that we are connected to the larger community of life (Lyle, 1994)? I think so. For the past three years (1995-1998) I have worked with a team of students, faculty, and designers to design such a building. As a first step, we hired two graduates from the Class of 1993 to help coordinate

[1]Adapted from *Conservation Biology* (June, 1997).

[2]Text based on the 2000 Dodgen Lecture delivered at the annual meeting of the Mississippi Academy of Sciences, February 24.

the design of the project and to engage students, faculty, and the wider community in the design process. We also engaged architect, John Lyle, to help conduct the major design charettes or planning sessions that began in the fall of 1995. Some 250 students, faculty, and community members participated in the thirteen charettes that set the goals for the 14,000 ft^2 building. The final program called for a building:

- Discharging no wastewater, i.e. drinking water in, drinking water out;
- Generating more electricity than it used;
- Using no materials known to be carcinogenic, mutagenic, or endocrine disrupters;
- Maximizing energy and materials efficiency;
- Made from products and materials grown or manufactured sustainably;
- Landscaped to promote biological diversity;
- Promoting analytical skill such as least-cost end-use analysis and life-cycle costing as well as practical competence in horticulture, gardening, ecological engineering, landscape management, restoration ecology, solar technologies; and
- That met rigorous requirements for full-cost accounting.

We intended, in other words, a building that did not impair human or ecological health somewhere else or at some later time and one that instructed passively through its design and actively through routine operations.

From 26 architectural firms that applied for the job, we selected William McDonough & Partners in Charlottesville, Virginia. Part of their task was to coordinate a larger design team that would meet throughout the process. To fulfill the requirement that the building generate more electricity than it used, we engaged Amory Lovins and Bill Browning from the Rocky Mountain Institute as well as scientists from NASA, Lewis Space Center. In order to meet the standard of zero discharge we hired John Todd and Michael Shaw, the leading figures in the field of ecological engineering. For landscaping we brought in John Lyle and the firm of Andropogen, Inc. from Philadelphia. To this team we added structural and mechanical engineers (Lev Zetlin, Inc. New York City), and a contractor. In all, some 18 experts representing a dozen or more fields participated in the design phase. During programming and schematic design this team and representatives from the College met by conference call weekly and in regular working sessions.

The team approach to architectural design was new to the College. Typically, architects design a building, hire engineers to heat and cool it, and bring in landscapers to make it look pretty. By engaging the full design team from the beginning we intended to improve the integration of building systems and technologies and the relationship between the building and its landscape. Early on, we decided that the standard for technology in the building was to be state-of-the-shelf, but within state-of-the-art design. In other words, we did not want the risk of untried technologies, but we did want the entire building to be at the frontier of what it is now possible to do with ecologically smart design.

The building program called for major changes, not only in the design process but also in the selection of materials, relationship to manufacturers, and in the way we counted the costs of the project. We intended to use materials that did not compromise human or ecological health somewhere else or at some later time. We also wanted to use materials that had as little embodied fossil energy as possible, hence giving preference to those locally manufactured or grown. In the process we discovered how little is known about the ecological and human effects of the materials used in construction. Unsurprisingly, we also discovered that the present system of building codes does little to encourage innovation leading to greater resource efficiency and environmental quality.

Typical buildings give a kind of snapshot of the state of technology about one year before they open, which means that they are obsolete the day they open. But we intended for this building to remain technologically dynamic over a long period of time by making it possible to adapt easily to changing technology. The use of raised flooring, for example, will permit quick changes of wiring and air-handling systems. Similarly, we intend to lease a photovoltaic array from a manufacturer so that the system can be upgraded as technology improves.

The same strategy is being applied to some materials as well. Buildings represent a union of two different metabolisms, one technical and one ecological (McDonough and Braungart, 1998). Materials that might eventually decompose into soil are part of an ecological metabolism. Otherwise they are “technical nutrients” to be leased from the manufacturer and eventually returned as a feedstock to be remanufac-

ENERGY COSTS TO HEAT, VENTILATE, LIGHT, AND COOL MEASURED IN BTUs/FT^2/YEAR

The Lewis Center:	Federal Standards:	Aver. for new construction:
16,500	50,000	~75,000

Figure 1

tured into new product. Carpet in the building, accordingly, will be leased from Interface Corporation as a "product of service." When worn out or changed, it will be returned to Interface to be made into new carpet, not sent to a landfill. This means that Interface designs carpet that it wants back and that landfills do not fill up with a bulky material impervious to decay for thousands of years.

The costs of new buildings are typically calculated narrowly to include only those of design and construction excluding life-cycle operating costs and those to environment and human health. The result is a gross underestimate of what buildings actually cost their owners over their useful lifetime and what price they exact from society. In contrast, we will assess life-cycle costs of this building including the amount of CO_2 released in the construction phase.

From computer simulation (DOE-2) we anticipate that the total electrical budget to heat, ventilate, air-condition, and light will be ~63,000 kwh/yr or 16,499 Btus/ft^2/yr. This is approximately 22% of the average for comparable new construction in northern Ohio as shown in Figure 1.

The electrical system for the Center will consist of a 3700 ft^2 photovoltaic array which may be combined with a fuel cell. In a cloudy climate the technological problem is to level out energy production from sunlight and actual energy use. With help from NASA scientists and others our plan is to do so as shown in Figure 2.

The building is designed to purify wastewater on site using a living machine developed by John Todd. It will minimize or eliminate the use of toxic materials. It will be instrumented to display energy and significant ecological data in the atrium. The story of the building will be prominently displayed throughout the structure. The landscape will include a restored wetland and forest as well as gardens, orchards, and greenhouse, all maintained by students. The south entry is a plaza, named in honor of its designer, John Lyle, featuring a sundial marking winter and summer solstices. The landscape will be used as much as classrooms to teach horticulture, gardening, landscape management, and ecological design.

Groundbreaking on the Adam Joseph Lewis Center for Environmental Studies occurred in September, 1998. We took occupancy in January of 2000. As important as the building and its landscape, the more important effects of the project have been the impact on those who participated in the project. Many of the students, who learned ecological design by working with some of the best practitioners in the world, now describe the Center as their "legacy" to the College. Faculty who participated perhaps are less pessimistic about the possibilities for institutional change. And the President, Nancy Dye, who initially authorized the project, has shown other administrators that risks for the right purposes can pay off.

The real test, however, lies ahead. It will be tempting for some, no doubt, to regard this as an interesting, but isolated experiment having no relation to other buildings now in the planning stage or for campus landscaping or resource management. The pedagogically challenged will see no further possibilities for rethinking the process, substance, and goals of education. If so, the Center will exist as an island on a campus that mirrors the larger culture. On the other hand, the project offers a model that might inform:

ADAM JOSEPH LEWIS CENTER ENERGY SYSTEM

PHOTONS ➜ ELECTRONS ➜ HYDROGEN ➜ ELECTRONS + HEAT ➜ H_2O
SUNLIGHT ➜ PHOTOVOLTAICS ➜ ELECTROLYSIS ➜ FUEL CELL

Figure 2

- Architectural standards for all new construction and renovation;
- Landscape management;
- Financial criteria for payback times and full-cost accounting;
- Courses and projects organized around real problems;
- How we involve the wider community; and
- Campus-wide planning.

Colleges like many other organizations are often risk averse, slow to innovate, administratively fragmented, and focused on the short-term. To succeed, however, this project required: a willingness to risk failure, the capacity to make timely decisions, integrated planning, and a long-term planning horizon. New wine should not be put in old wineskins. We set out to change the ecology of a single building only to discover that to do so it was necessary to change the ecology of the planning process.

By some estimates, humankind is preparing to build more in the next half century than it has built throughout all of recorded history. If we do this inefficiently and carelessly, we will cast a long ecological shadow on the human future. If we fail to pay the full environmental costs of development, the resulting ecological and human damage will be irreparable. To the extent that we do not aim for efficiency and the use of renewable energy sources, the energy and maintenance costs will unnecessarily divert capital from other and far better purposes. The dream of sustainability, however defined, would then prove to be only a fantasy. Ideas and ideals need to be rendered into models and examples that make them visible, comprehensible, and compelling. Who will do this?

More than any other institution in modern society, colleges and universities have a moral stake in the health, beauty, and integrity of the world our students will inherit. We have an obligation to provide our students with tangible models that calibrate our values and capabilities, models that they can see, touch, and experience. We have an obligation to create grounds for hope in our students who sometimes define themselves as the "X generation." But hope is different than wishful thinking so we have a corollary obligation to equip our students with the analytical skills and practical competence necessary to act on high expectations. When the pedagogical abstractions, words, and whole courses do not fit the way the buildings and landscape constituting the academic campus in fact work, they learn that hope is just wishful thinking or worse, rank hypocrisy. In short, we have an obligation to equip our students to do the hard work ahead of:

- learning to power civilization by current sunlight;
- reducing the amount of materials, water, and land use per capita;
- growing their food and fiber sustainably;
- disinventing the concept of waste;
- preserving biological diversity;
- restoring ecologies ruined in the past century;
- rethinking the political basis of modern society;
- developing economies that can be sustained within the limits of nature;
- distributing wealth fairly within and between generations.

No generation ever faced a more daunting agenda. True. But none ever faced more exciting possibilities either. Do we now have or could we acquire the know-how to power civilization by current sunlight or to reduce the size of the "human footprint" (Wackernagel and Rees, 1996) or grow our food sustainably or prevent pollution or preserve biological diversity or restore degraded ecologies? In each case I believe that the answer is "yes." Whether we possess the political will and moral energy to do so remains to be seen.

Finally, the potential for ecologically smarter design in all of its manifestations in architecture, landscape design, community design, the management of agricultural and forest lands, manufacturing, and technology does not amount to a fix for all that ails us. Reducing the amount of damage we do to the world per capita will only buy us a few decades, perhaps a century if we are lucky. If we squander that reprieve, we will have succeeded only in delaying the eventual collision between unfettered human desires and the limits of the earth. The default setting of our civilization needs to be reset to ensure that we build a sustainable world that is also humanly sustaining. This is not a battle between left and right or haves and have-nots as it is often described. At a deeper level the issue has to do with art and beauty. In the largest sense, what we must do to ensure human tenure on the earth is to cultivate a new standard that defines beauty as that which causes no ugliness somewhere else or at some later time.

LITERATURE CITED

Lyle, John. 1994. Regenerative Design For Sustainable Development. New York: John Wiley.

McDonough, William, and Michael Braungart. 1998. The Next Industrial Revolution. The Atlantic Monthly. 282 (4):82–92.

Orr, D. 1993. Architecture as Pedagogy. Conservation Biology.

Rocky Mountain Institute. 1998. Green Development. John Wiley, New York.

Sherman, T. 1996. A Place on the Glacial Till. Oxford University Press, New York.

Wackernagel, M., and W. Rees. 1996. Our Ecological Footprint. New Society Publishers, Philadelphia.

Limited Expression of *C-erbB-2* in Node Negative Breast Cancer Patients

Manubai S. Patel[1], Steven A. Bigler[2], Charles F. Streckfus[3], Stephanie F. Elkins[1], J. Tate Thigpen[1], Ralph B. Vance[1], and Lenora G. Bigler[1, 4]

Departments of Medicine[1], Pathology[2], and Dental Research[3],
University of Mississippi Medical Center, Jackson, MS 39216-4505

Forty-three cases of node-negative breast cancer were treated at the University of Mississippi Medical Center from 1986–1992. Patient profiles were as follows: average age was 53 years; 86% of the cases were diagnosed as infiltrating ductal carcinoma; 64% of the population were African-American and 36% were Caucasian. The average tumor size was 2.92 cm (±2.22 cm). In nine cases the tissue was unacceptable for immunohistochemical staining, therefore, only 34 tumors were examined for ***c-erbB-2*** staining. We found that 19 (56%) of the tumors examined exhibited some degree of ***c-erbB-2*** expression (5 were strongly positive, 14 were weakly positive), while 15 (44%) of the tumors examined were negative for ***c-erbB-2*** expression. Of the patients that were erb positive, only 4 had recurrence of disease after a 5-year follow-up and 4 were deceased from disease progression. Therefore, there appears to be no statistical evidence that ***c-erbB-2*** is a marker for survival in node-negative breast cancer patients in the population examined in this study.
Key Words: ***c-erbB-2***, immunohistochemistry, node-negative breast cancer

Breast cancer is the most commonly diagnosed cancer in women and the second leading cause of death in women in the United States today. The American Cancer Society estimates that in 2000, approximately 185,000 new cases of female breast cancer will be diagnosed in the United States, and 43,500 women will die of the disease. With the advent of screening mammography, more breast cancer is being detected at earlier stages, it is usually confined to the breast and has no nodal involvement. However, 30% of these cases will recur due to micrometastases present at the time of diagnosis (Allred et al., 1992). Chemotherapy has been shown to improve disease-free survival in axillary node-negative patients, but overall survival has not been affected by treatment (Allred et al., 1992; Hayes, 1996). Therefore, the choice of adjuvant therapy for node negative patients is difficult and often times controversial.

Some of the key decisions in the current management of primary breast cancer involve the need for prognostication. Currently, the single most important prognostic factor is the number of positive axillary lymph nodes. Another valuable pathologic factor is tumor size, which has independent prognostic significance and is of particular importance in the prognosis for node-negative-patients (Allred et al., 1998). Other significant pathologic features include poor cellular differentiation, histological and nuclear grade, and the presence of lymphatic and/or vascular invasion (Allred et al., 1998). These factors are consistently associated with worse patient outcome although there appears to be considerable interobserver variation in assessing these features.

Of the biochemical measurements currently available, the most important is the presence or absence of estrogen and progesterone receptors in the tumor (Allred et al., 1998; Richner et al., 1990). However, much attention has recently been focused on the amplification or overexpression of the ***c-erbB-2*** oncogene and its gene products. The gene for ***c-erbB-2*** encodes a 185kD glycoprotein which is structurally homologous to the epidermal growth factor receptor (Maguire and Greene, 1989). Antibodies have been developed to peptides in the region of the C-terminus of the ***c-erbB-2*** protein which will generally react with paraffin-embedded tissue following deparaffinization and permeabilization of the membrane with methanol. Therefore, retrospective

[4]Author for correspondence. Division of Medicine/Oncology, telephone: 601-984-5784

examination of archival tissues is possible. A number of studies have indicated that ***c-erbB-2*** is amplified and overexpressed in approximately 30% of primary adenocarcinomas of the breast, however, data evaluating the prognostic significance of ***c-erbB-2*** in node-negative patients have yielded conflicting results (Maguire and Greene, 1989; Torre et al., 1997; Hartmann et al., 1994). This study was designed to evaluate the prognostic significance of ***c-erbB-2*** expression in node-negative breast cancer patients treated at the University of Mississippi Medical Center from 1986 to 1992 whereby a reasonable follow-up period would have passed for patient evaluation.

MATERIALS AND METHODS

Patient Population—A total of 43 patients with node-negative breast cancer were treated at our institution between 1986 and 1992. Patients were excluded from the study if the paraffin blocks were not available, they had ductal carcinoma in situ, lobular carcinoma in situ or Paget's disease. This left a total of 34 patients with tissue acceptable for examination in this study.

Primary treatment of the patients consisted of modified radical mastectomy or lumpectomy, followed by radiation treatment. Complete axillary lymph node dissection was performed on all patients. Clinical information and patient characteristics are presented in Table 1. Histological grade and ***c-erbB-2*** staining was independently reviewed and evaluated by a certified pathologist following the criteria of Bloom and Richardson (1957).

Immunohistochemistry—Immunohistochemical staining for ***c-erbB-2*** was performed using a standard avidin-biotin-peroxidase technique (Vector Labs, Burlington, CA). Briefly, 5 µm paraffin sections were placed on charged microscope slides, baked in a convection oven at 57°C, deparaffinized in xylene for 10 minutes and rehydrated through graded alcohol. Prior to immunostaining, the sample slides were processed as directed by the manufacturer to recover antigenicity using the antigen retrieval CITRA system (Biogenex, San Ramon, CA). Following antigen retrieval, the sections were washed in phosphate-buffered saline and incubated with normal serum for 10 minutes. Samples were then incubated with a 1:40 dilution of ***c-erbB-2*** antibody (clone NCL-CB11, Novocastra Laboratories, UK) for 1 hour at room temperature. After washing with Tris-buffered saline, the slides were incubated with secondary biotinylated antibody for 10 minutes, washed, and incubated with the avidin-biotin complex for 5 minutes. Following a series of washes, the peroxidase reaction was completed using diaminobenzidine with a nickel solution being added to achieve a black color. Sections were then dehydrated through graded alcohol and mounted. Only membrane staining was considered and scored as strongly positive, weakly positive or negative.

Statistical Methods—The statistical analyses were performed using the SPSS statistical software package and conducted in two phases. The first phase was descriptive which included means and standard deviations where applicable. Bivariant frequency distributions were performed on all dichotomous variables that were associated with the outcome variable of current status (living, deceased) and recurrence (tumor recurred, tumor did not recur). Chi squares were performed to determine if associations existed between the predictor and outcome variables. The alpha level was $p=<0.05$. The second phase employed multiple Pearson product-moment correlation coefficients among variables with interval data.

RESULTS

A total of 43 patients with node-negative breast cancer were treated at the University of Mississippi Medical Center from 1986–1992. Of these, 34 had tissue suitable for immunostaining. The clinical history and general statistics regarding these patients are presented in Table 1.

Table 1. Characterization of node-negative patients.

Mean patient age*	Race	Histologic diagnosis	Mean tumor size#
56 years	Caucasian	All 12 were infiltrating ductal carcinoma	2.32 cm
52 years	African-American	17 were infiltrating ductal carcinoma, 2 infiltrating lobular carcinoma, 1 neuroendocrine; 1 medullary; 1 other	3.15 cm

* Mean age at diagnosis for entire population = 53.5 years
\# Average tumor size for total population = 2.85cm

The estrogen receptor (ER) status was positive in 71.9% of the patients and 28.1% were ER negative. Thirty-eight point seven percent of the patients were progesterone receptor negative, with 61.3% being positive. Twenty-seven patients had received adjuvant treatment and 7 had no adjuvant therapy. Of the 27 receiving chemotherapy, 12 received a combination of cyclophosphamide, methotrexate and 5-fluorouracil (CMF), 12 received tamoxifen and 3 received a combination of CMF and tamoxifen. With a minimum of 5 years follow-up, 6 patients had recurrence of their disease and 6 had died from disease progression.

Figures 1 and 2 demonstrate the representative staining patterns of ***c-erbB-2*** in two of the patients in this study. Of the 34 patients tested for over-expression of ***c-erbB-2***, fifteen were negative, 5 were strongly positive and 14 were weakly positive. It was interesting to note that of the strongly positive group, 4 of the 5 were African-American. The Caucasian patients equally expressed some levels of ***c-erbB-2*** or were negative (6-6); while only 9 African-American patients were totally negative. Overall, there was no statistically significant association between the expression of ***c-erbB-2*** and recurrence of disease or overall survival. Furthermore, there was no significant association between expression of ***c-erbB-2*** and ER/PR status, size of the tumor or nuclear grade. However, more recurrent tumors did express ***c-erbB-2*** than non-recurrent tumors (4 vs 2).

Figure 1. Positive *c-erbB-2* expression in a 57-year old African-American patient with infiltrating ductal carcinoma. Note the distinct staining of the cell membranes as detected by immunohistochemistry. (150X magnification)

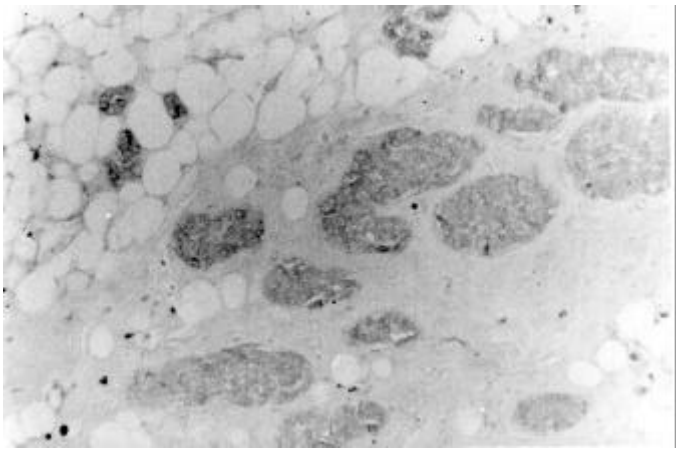

Figure 2. Focal intraductal carcinoma, comedo pattern, in a 32-year old African-American patient with infiltrating ductal carcinoma demonstrating weakly positive reaction for *c-erbB-2* by immunohistochemistry. (50X magnification)

DISCUSSION

c-erbB-2 is an oncogene that encodes a transmembrane glycoprotein receptor that, when overexpressed, can predict for a poor prognosis in a number of cancers (Maguire and Greene, 1989). Recent studies have demonstrated that ***c-erbB-2*** expression plays a role in the prediction of responsiveness to adjuvant therapy with those having overexpression being less responsive than those with normal expression (Carlomagno et al., 1996; Ravdin and Chamness, 1995). Patients with ovarian cancer and node-positive breast cancer have shown a correlation between overexpression of ***c-erbB-2*** and prognosis (Meden and Kuhn, 1997), but the studies which have examined the importance that ***c-erbB-2*** may play in node-negative patients have proven to be ambiguous. Some studies have shown no correlation with the expression of ***c-erbB-2*** and outcome while others claim to demonstrate an association with prognosis and ***c-erbB-2*** expression (Allred et al., 1992; Richner et al., 1990; Hartmann et al., 1994). One retrospective analysis of ***c-erbB-2*** expression in node-negative patients reported that estrogen receptor positive, ***c-erbB-2*** negative patients had the longest overall and disease-free survival rates (Richner et al., 1990). In contrast, low risk patients (i.e., ER positive and tumor size < 3cm) that had tumors that overexpressed ***c-erbB-2*** had worse overall and disease-free survival when compared to ***c-erbB-2*** negative patients. Thus, there may be a subset of node-negative patients that have otherwise positive prognostic factors (ER status, size and grade) who may benefit from adjunct chemotherapy if they overexpress ***c-erbB-2*** (Allred et al., 1992).

In our study there was no statistical significance associated with ***c-erbB-2*** expression and overall survival, however the number of patients examined was small and the overall survival was so great to begin with that it was difficult to determine significance. Therefore, until a larger population of node-negative patients is analyzed, the test for ***c-erbB-2*** should still be utilized to aid in the prognosis of node-negative cancer patients.

ACKNOWLEDGMENTS

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LITERATURE CITED

Allred, D.C., G.M. Clark, A.K. Tandon, R. Molina, D.C. Tormey, K. Osborne, K. Gilchrist, E. Mansour, M. Abeloff, and W.L. McGuire. 1992. Her-2/neu in node-negative breast cancer: Prognostic significance of overexpression influenced by the presence of in situ carcinoma. J. Clin. Oncology 10:599–605.

Allred, D.C., J.M. Harvey, M. Berardo, and G.M. Clark. 1998. Prognostic and predictive factors in breast cancer by immunohistochemical analysis. Modern Pathol. 11:155–168.

Bloom, H.J.G., and W.W. Richardson. 1957. Histological grading and prognosis in breast cancer. British J. Cancer 11:359–377.

Carlomagno, C., F. Perrone, C. Gallo, M. DeLaurentiis, R. Lauria, A. Morabito, G. Pettinato, L. Panico, A. D'Antonio, A.R. Bianco, and S. DePlacido. 1996. ***c-erbB-2*** overexpression decreases the benefit of adjuvant tamoxifen in early-stage breast cancer without axillary lymph node metastases. J. Clin. Oncology 14:2702–2708.

Hartmann, L.C., J.N. Ingle, L.E. Wold, G. Farr, J. Grill, J. Su, N. Maihle, J. Krook, T. Witzig, and P. Roche. 1994. Prognostic value of ***c-erbB-2*** overexpression in axillary lymph node positive breast cancer. Cancer 74:2956–2963.

Hayes, D.F. 1996. Should we treat HER, too? J. Clin. Oncology 14:697–699.

Maguire, H.C., and M.I. Greene. 1989. The neu (***c-erbB-2***) oncogene. Sem. Oncol. 16:148–155.

Richner. J., H.A. Gerber, G.W. Locher, A. Goldhirsch, R.D. Gelber, W.J. Gullick, M. Berger, B. Groner, and N. Hynes. 1990. ***c-erbB-2*** protein expression in node negative breast cancer. Ann. Oncol. 1:263–268.

Meden, H., and W. Kuhn. 1997. Overexpression of the oncogene ***c-erbB-2*** (HER2/neu) in ovarian cancer: a new prognostic factor. Eur. J. Obst. Gyn. & Rep. Biology 71:173–179.

Ravdin, P.M., and G.C. Chamness. 1995. The ***c-erbB-2*** proto-oncogene as a prognostic and predictive marker in breast cancer: A paradigm for the development of other macromolecular markers—a review. Gene 159:19–27.

Torre, E.A., V. Salimbeni, and R.A. Fulco. 1997. The ***c-erbB-2*** oncogene and chemotherapy: a mini-review. J. Chemotherapy 9:51–55.

President's Column
The Science and the Scientists of the 21st Century

Growing up in Los Alamos, New Mexico, I was exposed to science at an early age. My dad was a physician who went into pathology because "the patients never complained." We autopsied my horse when it died of asthma and I was (his) county coroner's assistant when bodies floated up in the irrigation ditches near Española. My high school teachers supported many "hair brained" science fair projects and inspired me to go on to college. At New Mexico State I discovered WORMS—gorgeous creatures with strange life cycles inhabiting everyone's innards. A professor took an interest in me and I was his research assistant for two summers and a Masters Degree. Parasitized for life—I became a medical parasitologist with a southern fried Ph.D. from LSUMC in New Orleans. The experience of growing up in a scientific community and getting special attention from my dad, high school teachers and college professors shaped my future. That is what I believe educating the scientists of the 21st Century is all about.

One of my favorite parasitologists, Robert Hegner[1] wrote,

> BIG FLEAS Have LITTLE FLEAS
> Upon Their Backs to bite 'em,
> And LITTLE FLEAS have LESSER FLEAS
> And so, AD INFINITUM.

Little did he know how far infinitum might reach. Fifty years later it is possible to tell by examining their DNA exactly how excited those bugs get (which genes are involved) and what they do when they are in bug heaven chomping down on your intestinal mucosa. Using bioinformatics and gene arrays to find new antimicrobials is but one application of the newest new biology. Everything, biochemistry, microbiology and worms are "going molecular"! Our students will go beyond anything we imagined!

How can we equip the students of today to become the scientists of tomorrow? To go where none have gone before? The meetings of the Mississippi Academy and Junior Academy of Science provide one answer. What better place to excite with the latest research, to explore educational options, to equip with the latest gadgets and emulate those who have encountered the un-expected and excelled. The annual meeting of the Mississippi Academy of Sciences is a great place for a student to feel that intellectual spark take hold and lead them into their future. Mississippi's people are its greatest strength. Our success in enticing and motivating the scientists of tomorrow will depend upon our ability to work together to make this state a leader in science education. Joan Messer, MAS President Elect, has also been elected to lead the national Junior Academies of Science. We are already leaders in some areas!

How can you help? Participate in MAS and bring others to that "Ah HAH!" experience. Share your enthusiasm and joy of discovery with your students. Encourage them to submit abstracts and participate in the annual meeting. This year the meeting will be in north Mississippi close to MSU, Ole Miss, MUW and a host of community colleges and high schools. This year more students will be exposed to the rich and diverse scientific environment of this state and their future will be infected with the light of knowledge. Lead the way. Please go out of your way to recruit new members for our society, to work with colleagues in promoting research and communicating it with others. This can be the best meeting ever, all we need is you.

Our Dodgen Lecturer will be Dr. Jerome Goddard, Medical Entomologist with the Mississippi Department of Health. Jerome, a graduate of both Ole Miss and MSU, will share his research in "Ticks And Tick Ecology In Mississippi: Implications For Human Disease Transmission." He is an entertaining lecturer and famous author of a "Physician's Guide to Arthropods of Medical Importance". I know you and your students will enjoy his talk.

Our new web site (www.msacad.org) makes it easy to submit an abstract, register or read the program. See you there?—William B. Lushbaugh.

[1]Hegner, R.W., 1938. *Big fleas have little fleas: or who's who among the protozoa*. Williams & Wilkins, Baltimore, USA.

Executive Officer's Column

If your email address is on file with the Mississippi Academy, you recently received a notice that we have a new WEB site address and a new WEB site look. If you did not get the message, our address is now <http://www.msacad.org>. The most important modification of the site deals with membership, preregistration, and abstract submission. Members now have the ability to submit the necessary information directly from the WEB site.

Once you have completed membership information, your name will be automatically entered into an alphabetized drop down list on the preregistration and abstract submission pages. Names of Life Members are already on this list. If your name is there, you may then send in your abstract and/or preregister for our upcoming meeting. We have always required current membership in order for us to consider an abstract; this system electronically enforces that requirement. Please note that in order to submit an abstract for the 2001 meeting, you must join the Academy or renew your membership when you submit that abstract.

While the new system should make things easier for our members, it will really streamline matters for me at submission time and at the Academy Office. I always seem to have an exam to grade right at the abstract deadline. Any electronic assistance can only serve to make things better. Alas, since we have not yet figured out a way to use the WEB or FAX machine to collect fees, everyone will still need to send in payments.

I'd like to reemphasize a point I made in the last issue. The Academy needs to begin planning for our 75th anniversary. The MAS is one of the oldest state academies in the country and we should be rightly proud of this fact. We are also one of the most active. An appropriately boisterous celebration will be in order when we reach the ripe old age of 75.—John Boyle

Report from the Mississippi Academy of Sciences Delegate to the American Association for the Advancement of Science and National Association of Academies of Sciences Annual Meetings, February 16–22, 2000 in Washington, DC

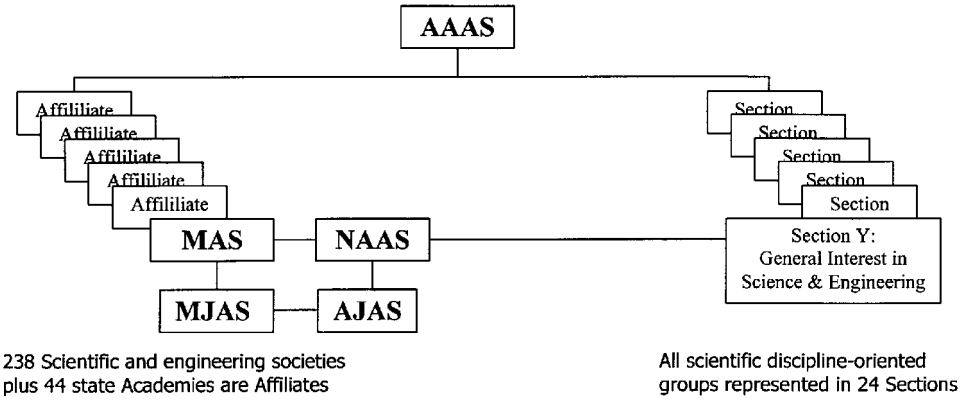
While many of you are familiar with the Mississippi Academy of Sciences (MAS), you may not be aware of our relationship with the American Association for the Advancement of Science (AAAS). It therefore seems worthwhile to outline the relationship and stated mission of the various organizations involved.

Two types of groups comprise the AAAS. First there are the Affiliates; 238 professional scientific and engineering societies plus 44 state Academies of Science, including the MAS. The National Association of Academies of Sciences (NAAS) is an umbrella organization for state Academy of Science Affiliates. Second, there are 24 Sections based on scientific disciplines. Collectively, through the NAAS, all state Academy Affiliates belong to Section Y: General Interest in Science and Engineering.

The Mississippi Academy of Sciences and NAAS sponsor parallel organizations promoting research by high school science students. The MAS sponsors the Mississippi Junior Academy of Sciences (MJAS) and the NAAS sponsors at the American Junior Academy of Sciences (AJAS). Winners of our statewide MJAS annual research paper competition travel to national concurrent meetings of the AAAS and NAAS to present their research results at the annual AJAS meeting.

The mission of each organization is summarized below and further details can be found at the web sites. Before summarizing several noteworthy items, it seems worthwhile to outline the relationship and review the stated mission of various organizations involved.

Abbreviated Organizational Chart



AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE (AAAS) Fostering scientific freedom and responsibility, improving the effectiveness of science.
URL: http://www.aaas.org

NATIONAL ASSOCIATION OF ACADEMIES OF SCIENCES (NAAS) Designed to foster the goals held in common by the American Association for the Advancement of Science and its member [state] academies in accomplishing their own purposes. Sponsor of the American Junior Academy of Sciences (AJAS).
URL: http://astro.physics.sc.edu/NAAS/NAAS.html

AMERICAN JUNIOR ACADEMY OF SCIENCES (AJAS) Sponsors national meeting of student representatives from state academies of science at which results of their high school science research projects are presented.
URL:
http://astro.physics.sc.edu/NAAS/AJAS/start.html

MISSISSIPPI ACADEMY OF SCIENCES (MAS) An organization of scientists, engineers, technicians, science educators and others from schools and universities, government, industry and business. These individuals, joined by the state's academic institutions and other MAS institutional members, support science in our state. Sponsor of the Mississippi Junior Academy of Sciences (MJAS).
URL:
http://www.msstate.edu/Org/MAS/MAS.HTML

MISSISSIPPI JUNIOR ACADEMY OF SCIENCES (MJAS) Sponsors annual statewide scientific paper competition. A member and active participant in American Junior Academy of Sciences activities.
URL: http://mssci.org

ITEMS OF INTEREST FROM THE AAAS AFFILIATES MEETING

Update on Court Appointed Experts Project: Federal Judges should be gatekeepers of scientific information and its use in court. The AAAS is helping to shape policy and provide a mechanism for selecting experts appointed for the benefit of the court rather than the prosecution and defense. For details and updates, see AAAS website: http://www.aaas.org

Actions Regarding OMB Circular A-110: Congress passed legislation, under an amendment sponsored by R. Shelby (R-AL), requiring government agencies to make federally funded research and data available to the public. The AAAS is concerned about broad definition of "data" and unfettered public access. Court test likely now as US Chamber of Commerce has filed three Freedom of Information Act request with the Environmental Protection Agency. For details and updates, see AAAS website: http://www.aaas.org

ITEMS OF INTEREST FROM THE NAAS DELEGATES MEETING

Scientific Society Responses to Evolution Controversy in Kansas: To become informed and responsible citizens in our increasingly technological world, students need to study and judge for themselves the empirical evidence and concepts central to current scientific understanding. In an attempt to side-step court-supported inclusion of teaching evolution, the Kansas State Board of Education voted to remove references to evolution and cosmology from its state education standards and assessments. The American Association for the Advancement of Science deplores this decision.

The NAAS sponsored a workshop: "Will Kansas be Cloned? Strategies for Acceptance of Evolution in Public School Science Curricula." Ideas were exchanged on how individual scientists (for example, at church group discussions) and state Academies (via prepared statements, access to knowledgeable speakers) can be prepared in advance to address future incidents on this topic. The AAAS will consolidate this information on their website.

The AAAS and NAAS request State Academies support for the teaching of evolution. For background information and updates on this subject, see websites for the National Center for Science Education (http://natcenscied.org) and AAAS (http://www.aaas.org).

Among many items, the National Center for Science Education maintains a list of scientific, professional and religious organizations that support the teaching of evolution (http://natcenscied.org, select "What We Do", then "Voices for Evolution"). It is noteworthy that MAS is not among the state academies listed as having endorsed this policy.

Election of AJAS Director: Dr. Joan Messer, outgoing Director of the MJAS, was elected to a three-year term as the AJAS Director. Her primary responsibility is organizing the annual national AJAS meeting including scientific (poster/oral presentations), educational (related sightseeing tours) and social programs in San Francisco (2001), Boston (2002), and Denver (2003).

MAS Representation at NAAS: Over 120 students and 30 chaperones from 25 state academies typically attended this event. MAS had the largest delegation in its history: Emily Almas, Alexander Clark, and Amit Goel gave excellent student poster and oral presentations, Mrs. Victoria Clark volunteered as a parent/chaperone, Dr. Messer represented MJAS and Dr. Case represented MAS.—Steven T. Case

MAS AWARDS

Nominations Solicited

*The **Awards and Resolutions Committee** seeks nominations from the membership at large for awards to be presented at the Annual Meeting of the Mississippi Academy of Sciences:*

- **Outstanding Contributions to Science**
  Recognizes a member of the MAS whose research, teaching, or service to the community has significantly furthered the cause of science
- **Dudley F. Peeler Outstanding Contributions to the Mississippi Academy of Sciences Award (Peeler Award)**
  Recognizes a member of the MAS for long-term service to the Academy itself.
- **Community/Junior College Science Teacher**
  Recognizes a member of the MAS with outstanding accomplishment in the teaching of science at the community or junior college level
- **Secondary Science Teacher**
  Recognizes a member of the MAS with outstanding accomplishment in the teaching of high school science

These awards recognize the exceptional contributions of fellow MAS colleagues. To nominate **a current MAS member** for any of these awards, please specify the award category and submit the following:

a. **two supporting letters** from members of the Academy having firsthand knowledge of the nominee's accomplishments
   - Nominees for the **Outstanding Contributions to Science** should exhibit a commitment to the acquisition, dissemination, and application of scientific knowledge. An extensive research publication record by itself is not the only criterion on which nominations are considered.
   - Nominees for the **Peeler Award** should exhibit long-term, fundamental contributions toward the advancement of the Mississippi Academy of Sciences.
   - Nominations for either of the **Science Teacher Awards** must include a summary of the nominee's science teaching achievements as well as a summary of outstanding achievements of the nominee's students.

b. **curriculum vitae of the nominee**
   - Include educational background, professional experience, current position and work address, and both daytime and evening phone numbers as well as any other information considered to be pertinent for a specific award.

c. **additional letters of support** (optional)
   - Letters of recommendation from persons who are not MAS members will be accepted but are not required.

Send nominations to:
Dr. Sarah Lea McGuire, Chair
MAS Awards and Resolutions Committee
Department of Biology
Post Office Box 150305
Millsaps College
Jackson, MS 39210

If you have questions or comments, please do not hesitate to contact the Chair at 601-974-1414 (phone), 601-974-1401 (FAX), or mcguisl@millsaps.edu (email).

DEADLINE FOR ALL NOMINATIONS IS DECEMBER 1, 2000

MISSISSIPPI ACADEMY OF SCIENCES ABSTRACT FORM/MEMBERSHIP FORM

ABSTRACT INFORMATION

Abstract title _____

Name of presenting author(s) _____
(Presenter must be a current (i.e., 2001 membership dues must be paid) student member, regular member, or life member of the MAS)

Telephone _____ Email _____

Check the division in which you are presenting

__ Agriculture and Plant Science
__ Cellular, Molecular and Dev. Biology
__ Chemistry and Chemical Engineering
__ Geology and Geography
__ Health Sciences
__ History and Philosophy of Science
__ Math., Computer Sci. and Statistics
__ Marine and Atmospheric Sciences
__ Physics and Engineering
__ Psychology and Behav. Neuroscience
__ Science Education
__ Social Sciences
__ Zoology and Entomology

Type of presentation

__ Poster presentation __ Workshop
__ Lecture presentation __ Invited symposium

If the presenting author for this paper is also presenting in another division, please list the other division: _____

Audio-visual equipment needs

__ 2" x 2" slide projector
__ Overhead projector

Other audio-visual equipment including computers and computer projection equipment must be provided by the speaker.

MEMBERSHIP INFORMATION

New __ Renewal __
Mr. Ms Dr. _____
Address _____
City, State, Zip _____
School or Firm _____
Telephone _____ Email address _____
PLEASE INDICATE DIVISION WITH WHICH YOU WISH TO BE AFFILIATED _____

Regular member $25 Student member $5 Life member $ 250
Educational $150 Corporate Patron $1000 Corporate Donor $500

CHECKLIST

The following MUST be DONE:

__ 1. Enclose copy of abstract (even if abstract has been submitted electronically)
__ 2. Complete and enclose abstract form /membership form(this form)
__ 3. Enclose the following payments (make check payable to Mississippi Academy of Sciences):
  __ $25 per abstract
  __ $25 regular membership fee OR $5 student membership fee (2001 membership must be paid for abstract to be accepted)
__ 4. You must supply a check # _____ or P.O. # _____ (credit cards are not accepted)

In addition you MAY preregister at this time:

__ Enclose the following payments:
  __ $20 regular member (after 15 Jan.) ___ $12 regular member (Preregistration before Jan. 15, 2001)
  __ $10 student member (after 15 Jan.) ___ $ 5 student member (Preregistration before Jan. 15, 2001)
  __ $50 nonmember (after 15 Jan.) ___ $40 nonmember (Preregistration before Jan. 15, 2001)

NOTE: Late abstracts will be accepted with a $10 late fee and only if there is room in the appropriate division. They will be published in the April issue of the MAS JOURNAL.

MISSISSIPPI ACADEMY OF SCIENCES—ABSTRACT INSTRUCTIONS
PLEASE READ ALL INSTRUCTIONS BEFORE YOU SUBMIT YOUR ABSTRACT

- Your paper may be presented orally or as a poster. Oral presentations are generally 15 minutes although some divisions allow more time. The speaker should limit a 15 minute presentation to 10–12 minutes to allow time for discussion; longer presentations should be limited accordingly. Instructions for poster presentations are given on the reverse side of this sheet.
- Enclose a personal check, money order, institutional check, or purchase order for $25 publication charge for each abstract to be published, payable to the Mississippi Academy of Sciences. The publication charge will be refunded if the abstract is not accepted.
- The presenting author must be a member of the Academy at the time the paper/poster is presented. Payment for membership of the presenting author must accompany the abstract.
- Attendance and participation at all sessions requires payment of registration.
- Note that three separate fees are associated with submitting and presenting a paper at the annual meeting of the Mississippi Academy of Sciences. (1) An abstract fee is assessed to defray the cost of publishing abstracts and (2) a membership fee is assessed to defray the costs of running the Academy. (3) Preregistration payment ($12 regular; $5 student) may accompany the abstract, or you may elect to pay this fee before January 15th, or pay full registration fees at the meeting.
- Abstracts may be submitted by e-mail or entered directly through the MAS website. The URL is http://www.msacad.org. This abstract submission form and the appropriate fees should be sent by US mail even if the abstract has been submitted electronically.
- Abstracts may be submitted as a WordPerfect, Word, ASCII, ANSI, or .RTF file on a PC readable diskette. *Formatting should be minimal*. This abstract submission form and the appropriate fees should be sent by US mail even if a diskette is used for the abstract.
- Abstracts may be submitted typed or printed on clean white paper. Abstracts received in this form will be scanned into a computer. Leave ample margins and use a sanserif type font to help minimize errors in scanning.
- Submit your abstract and appropriate fees to the Abstracts' Editor, John Boyle, TO BE RECEIVED NO LATER THAN NOVEMBER 1, 2000.
- Late abstracts will be accepted with a $10 late fee and only if there is room in the appropriate division. They will be published in the April issue of the MAS journal.

Dr. John Boyle
Mississippi State University
Dept. of Biochemistry
P.O. Drawer 9650
Mississippi State, MS 39762

FORMAT FOR ABSTRACT

- Your abstract should be informative, containing: (a) a sentence statement of the study's specific objectives, unless this is given in the title; (b) brief statement of methods, if pertinent; (c) summary of the results obtained; (d) statement of the conclusions. It is not satisfactory to state, "The results will be discussed."
- Your abstract, including a concise, descriptive title, author(s), location where work was done, text and acknowledgment, may not exceed 250 words.
- The title should be all capital letters. Use significant words descriptive of subject content.
- Authors' names start a new line.
- The institution where your research was done should include city, state, and zip code. Do not include institutional subdivisions such as department.
- The abstract should be one paragraph, single spaced, starting with a 3-space indentation.

- Use standard abbreviations for common units of measure. Other words to be abbreviated, such as chemical names, should be spelled out in full for the first use, followed by the abbreviation in parenthesis. Do not abbreviate in the abstract title.
- Special symbols not on your printer or typewriter must be in black ink.
- Use italics for scientific names of organisms.
- Begin authors' names on a new line. Place an asterisk (*) after the presenter(s), if there are multiple authors.
- Use superscripts for institutional affiliations where necessary to avoid ambiguity.
- Refer to these examples as guides.

EXAMPLES OF TITLES AND AUTHORS:

[single author, no ambiguity about designated speaker or affiliation]
AN EXPERIMENTAL MODEL FOR CHEMOTHERAPY ON DORMANT TUBERCULOUS INFECTION WITH PARTICULAR REFERENCE TO RIFAMPICIN
Joe E. Jones, Mississippi State University, Mississippi State, MS 39762
Abstract body starts here . . .

[two authors, both designated as speakers, different affiliations, but no ambiguity]
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Abstract body starts here . . .

GUIDELINES FOR POSTER PRESENTATIONS

- The Academy provides poster backboards. Each backboard is 34" high by 5' wide. Mount the poster on the board assigned to you by your Division Chairperson. Please do not draw, write, or use adhesive material on the boards. You must provide your own thumb tacks.
- Lettering for your poster title should be at least 1" high and follow the format for your abstract. Lettering for your poster text should be at least 3/8" high.
- Posters should be on display during the entire day during which their divisional poster session is scheduled. They must be removed at the end of that day.
- Authors must be present with their poster to discuss their work at the time indicated in the program.