

Proceedings
of the
Twenty-Seventh Annual
Texas Turfgrass Conference



TEXAS A&M UNIVERSITY

and

THE TEXAS TURFGRASS ASSOCIATION

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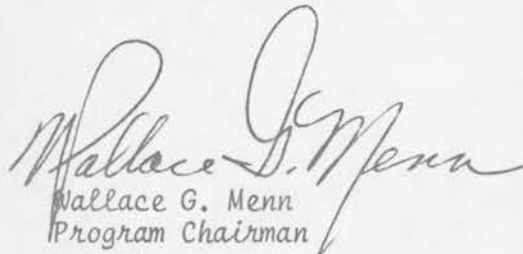
December 4-5, 1972



FOREWORD

We take this opportunity to extend our appreciation to all of those who contributed to the success of our recent 27th Texas Turfgrass Conference. We are happy to report a record registered attendance of 308 and look forward to reaching the 400 mark in the near future. It is intended that these Proceedings serve to preserve some of the knowledge imparted by the excellent speakers who participated during the annual Turf Meetings and that this information might enhance the production of higher quality turf throughout the State.

The growth of our Texas Turfgrass Association and Conference can only continue through the interest and support of dedicated members concerned with the future of the Turf profession in Texas.


Wallace G. Menn
Program Chairman

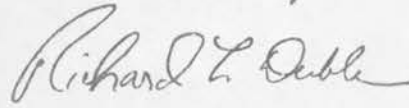

Richard L. Doble
Co-Chairman

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OPPORTUNITIES FOR THE PROFESSIONAL TURF MANAGER

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The opportunity for today's and tomorrow's professional turf manager is as great, if in fact, not greater than at any previous period of time. The turfgrass industry has reached a degree and level of maturity and recognition little hoped for even as recent as 25 years ago. Yet, it may still be considered a young, dynamic, growth oriented field with adequate challenge and almost unlimited opportunity for those currently involved; or, for those who may choose to become involved in the future.

A review of the turfgrass industry was presented by Nutter and Watson in the book Turfgrass Science (ASA Monograph No. 14). From a functional standpoint, the industry was shown to be composed of four branches. They are:

- (1) Facilities - that phase dealing with the management and maintenance of turfgrass facilities.
- (2) Manufacturing - that branch which provides the products.
- (3) Service - the branch which implements the utilization of both products and facilities.
- (4) Institutional - which includes schools, colleges, the extension services and the experiment stations.

These same authors presented a manpower profile broken into seven categories - professional, managerial, supervisory, technical, trainee and apprentice, production, and sales and marketing.

It is apparent that today's industry provides an opportunity in a number of different areas. The range of opportunities and the interest areas is sufficiently broad to satisfy and to challenge the individual, irrespective of his present position or situation.

Specific opportunity areas for the professional turf manager may be best depicted through a brief analysis of the past and the current status of one or two selected areas.

Research - basic and applied - provides the foundation for growth and expansion of any profession or industry. Certainly, this has been the case in the turfgrass field. Historically research directed toward turf improvement was initiated at the University of Connecticut in 1885 and at the University of Rhode

Island in 1890. By 1965, according to Huffine and Grau (Turfgrass Science, ASA Monograph No. 14) all but one of the 50 states were conducting research directly applicable to turfgrass. And this state initiated a program in 1972. The appended table lists the decade in which each state began turf experimental work.

The wealth of information that has resulted from the many and varied research projects conducted at the state agricultural experiment stations and by industry, has provided a sound scientific base for the turf industry and for the professional turf manager.

That the turf industry has responded and accepted the results and used them to continually improve turfgrass quality and use standards is most apparent. Yet, I submit that the industry as a whole, including the professional turf manager, has begun to "fall behind" and that today we do not utilize to the fullest extent the technology available from experiment station and industry researchers. They have accumulated a backlog of information that for a number of reasons the user has failed to take full advantage.

For a number of years the need for turfgrass research in all areas was most apparent - there was a need for information on soil properties required to support heavy and continuous traffic under all types of weather adversity, there was a need for superior turfgrasses, especially putting greens, there was a need for information to improve cultural practices, and there was need for pesticides of all types. There still is a need and the need will continue, perhaps become even more acute. Herein lies the first areas of opportunity for the professional turf manager - research and equally as important a need to identify research areas.

A second area that I should like to discuss is that which involves the dissemination of information - particularly research information. For it is this area that I believe offers a great opportunity for today's turf manager. Information accumulated and "put on the shelf", or discussed only with one's colleagues is of little value. If it is important, it must be translated into better turfgrass. This field of opportunity is generally referred to as "extension" and involves three major groups - college extension personnel, service groups for specialized areas (Green Section of U.S.G.A.) and commercial service personnel (industrial and private). What has and is happening in this field of activity is encouraging, but it needs expansion if the turf industry (all facets not just commercial interests) is to benefit to the fullest extent.

Dr. Fred Grau in a recent progress review of turfgrass said, "Fifty years ago the U.S.G.A. Green Section was just getting its feet on the ground". The staff was small and severely restricted. Men who took care of golf courses were known as greenkeepers. The only institution that taught anything about turf was the School of Hard Knocks. Golf was the "rich man's game" and any-

thing connected with it did not merit assistance from tax-assisted institutions. The only book in existence was Pipers and Oakleys, Turf for Golf Courses, published in 1917. Fairway mowers were pulled by horses, shod with leather boots. Greens mowers were people pushed.

Since those early days the turf industry has been served generously by a number of service groups. Many states provide service through extension personnel (and the number increases each year), the U.S.G.A. Green Section continues to answer and to counsel on problems of golf turf, primarily for its member clubs. Industrial extension, pioneered by the late O. J. Noer, continues to expand and to provide counsel and guidance in most of the areas of activity in the turf field. Yet, there exists a gap that appears to be widening each year.

It is my firm conviction that your exposure at this conference and at field days, regional and local meetings sponsored in whole or in part by the Texas Turfgrass Association and Texas A&M has kept you abreast of developments; but I am also convinced that each professional turf manager in this audience has information which would permit him to produce even better turf than he is growing today.

Let me emphasize two points in this respect. First, there is a wealth of research data and general information that is not being used - in many cases - is not being disseminated; and, secondly, our professional turf managers have information that they are not using and which if applied would lead to higher quality turfgrass than they presently grow. And, lead also to a greater awareness on the part of the general public of the role of turf in the landscape.

It is distressing to be called in on a severe turf problem which could have been prevented almost entirely if someone in authority had simply asked for guidance. I suppose most of us have had this type of experience. Why? Why is there a failure to take advantage of available information and to incorporate it into development and management programs for turf facilities.

The easy, and often too quick, response is "insufficient funds", or "not enough money". I disagree! And submit that the core problem is one of communication. Further, that as we look ahead the solution and resolution of this basic problem provides one of the greatest areas of opportunity for the professional turf manager. There seems to be a void or gap in the dissemination of research data as well as practical and applied techniques of turf culture - not necessarily from the research area to the turf manager nor from the manager to key personnel within his organization. Rather, the gap exists between the general public and those associated with the turf industry. We communicate very well and very

effectively with our colleagues, but we fail to communicate with those outside the turfgrass field. Yet, "we" the organized turfgrass associations are to a large extent the major vehicle - certainly the most potent and knowledgeable group available to narrow the communication gap with our consumers, our customers and our public.

In a recent editorial, Weeds Trees and Turf projected the idea that one of the major problems facing turf oriented or "Green Industry" organizations was the fact that they had failed to establish "exterior" goals. Praise was offered (and justly so) for the establishment and accomplishment of "interior" goals; but, the "climate of today's world is changing" editorialized Weed Trees and Turf. And, every organization associated with the "Green Industry" needs to develop and implement exterior goals. Those goals needed by every organization said Weed Trees and Turf include policy statements that define the activities of members by job description and function, and a broad public relations program to familiarize others with what is being done. "Green Industry" organizations have the potential solutions to many of the problems confronting the U. S. today. All we need to do is organize our exterior goals. With which we concur completely!

Perhaps, the most penetrating question the editor raised was, "who outside of our immediate industry has heard of your particular organization?"

Which restates the need to communicate with those not directly affiliated with, but who benefit directly and indirectly from organized turf groups.

The opportunity for the professional turf manager then is to "look ahead - look beyond" to expand his horizons and his areas of interest. It's a great opportunity for self-improvement and economic improvement.

Have you ever stood in a garden center on a warm spring Saturday morning? Try it. And listen to the questions asked by the consumer of turf products. He wants to know what seed, what fertilizer, what pesticide - and how to, when to and with what. The information gap is glaringly apparent! Regretfully, in many cases the clerks helping the customers are equally as poorly informed. Many garden centers, nurseries, and other outlets are adding technically qualified personnel on a temporary and permanent basis to counsel and guide during these peak periods of activity.

Is this an opportunity for the professional turf manager? Is it an opportunity for the Texas Turfgrass Association? Have you or your local group ever sponsored a "lawn clinic" for your club or for your community? Should you?

These remarks are meant to briefly outline areas of opportunity for the professional turf manager - not to be adversely critical of current activities. For, in point of fact, many individuals and many organizations have developed and implemented excellent programs of this type.

However, with the tremendous surge of new knowledge in all fields, the sheer problem of keeping up to date is almost overwhelming. Keeping up to date for the turf manager means reading, attending conferences, participating in short courses (when available). The entire field of continuing education provides an opportunity both from an instructional and from a participating standpoint. And at the local, regional, national and international levels.

The quality of the environment certainly stands high among the areas demanding attention by today's and tomorrow's turf manager. And, as we cope with the needs and complexities of our ever increasing, ever demanding and fast moving world, we must, at the same time, prevent pollution of land, air and water beyond a level that will be detrimental or tolerable by man. The turf and turf-oriented - the "Green Industries" stand at the threshold of the vast and, as yet, in many cases, undefined opportunities that are becoming and will become available. No one group has a better background of experience and knowhow than you. Use it!

Environmental quality groups have been formed at all levels - local, state, national and international. Some laws have been passed - some good, some bad. Some have been funded and some not.

Let me give you one example of what can happen when the uninformed become active politically. I was told recently that one of our leading agricultural states passed a law outlawing soil erosion! Now it must be enforced and funded. Certainly, an opportunity for someone to either further the boondoggle or to provide reasonable counsel and guidance.

What of the future in these areas of environmental concern? Certainly a greater awareness of both areas is with us. And, certainly there is an opportunity for today's and tomorrow's turf manager.

We can only hope as Dr. Chuck Gould said recently, "that rational decisions, based on fact, can be reached rather than, politically expediency or popular fancy serving as the base and the thrust for action".

The manufacturers of products that service the turf industries are going to continue to spend large sums for product developments, for produce evaluation, for produce use, for customer education and for product marketing areas. Opportunity? Yes!

What of the future for the professional turf manager who elects to direct his activity only toward the management and supervision of turf facilities? Some choose this and it is most commendable - perhaps some of you may have read Paul Voykin's recent editorial on this subject - a wise and thought-provoking topic.

However, a major area of opportunity is available to that individual who expands his managerial skills and who assumes additional responsibility. Without doubt, if we let the past guide our projections then we may be sure that tomorrow's professional turf manager will have a more complex and more demanding position with far more responsibility than is the case today. For, the same factors that brought change in the manager's duties and responsibilities during the past 15 to 20 years will be intensified in the future. And as we look ahead, I believe there is and will be continuing need, there is and will be continuing challenge, and there is and will be continuing opportunity for the professional turf managers. For:

"This time, like all other times, is a very good one, if we but know what to do with it." Ralph Waldo Emerson

Table 1. Decade Turf Research Initiated in the various states. Huffine and Grau, ASA Monograph 14. Turfgrass Science.

<u>DATE</u>	<u>STATE</u>
1885	Connecticut
1890	Rhode Island
1910	Missouri and Virginia
1920's	Alabama, Kansas, Massachusetts, Michigan, Montana, Nebraska, New Jersey, Ohio, Pennsylvania, Wisconsin
1930's	Illinois, Iowa, Maryland, Minnesota, Oregon, Tennessee, West Virginia
1940's	Arizona, California, Colorado, Florida, New York, Georgia, Indiana, Kentucky, Texas, Washington
1950's	Alaska, Arkansas, Maine, Mississippi, New Mexico, South Carolina, South Dakota, Utah, Vermont
1960's	Delaware, Hawaii, Louisiana, New Hampshire, Nevada, North Carolina, North Dakota, Wyoming
1970's	Idaho (not listed as conducting research at time of publication)

Table 2. Functional composition of the Turfgrass Industry, (Turfgrass Science, ASA Monograph). Chapter 2. Nutter-Watson.

BRANCH 1 - TURFGRASS FACILITIES

Airports	Hotels and motels
Athletic fields	Housing projects & subdivisions
Bowling and croquet greens	Industrial parks
Campuses (college & university)	Lawns
Cemeteries and memorial parks	Military bases
Churches and synagogues	Mobile home villages
Courthouses & govt. bldgs.	Parks and playgrounds
Exposition & fairgrounds	Race tracks
Garden apartments	Resorts
Golf courses & driving ranges	Retirement villages
Grass tennis courts	Schools
Highways	Zoos and Botanical gardens
Hospitals	

MANUFACTURING

Chemicals	Irrigation System Components
Equipment	Special products (soil amendm., sod)
Fertilizers	Supplies and Tools

SERVICING

Distributors and Retailers	Research organizations
Contract services	Trade & professional organizations
Architects & designers, Contractors	Information service organ. (USGA Green Section, Nat'l. Golf Foundation)
Consultants - business & technical	Publications
Service laboratories (soil, chem., water)	

INSTITUTIONAL

Colleges, universities	Extension service (county, state, federal)
Experiment stations	U.S. Department of Agriculture
Vocational - technical	



LEISURE AND THE YEAR 2000

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Let me look ahead to the year 2000 by first taking you back to a dramatic moment in history for all Americans. Where were you when you heard, "Eagle, you are in Tranquility." That message from Mission Control to the first man on the moon focused the attention of the world on the brilliance of American technology. It was a day to remember.

As back up, Eagle commanded a political consensus that our century has rarely enjoyed. For Eagle, the goal was precise: land a man on the moon and bring him back. Mission accomplished. There are those who still cry out as Apollo 17 gets "at the ready" that if we as a nation can accomplish such miracles, then we must certainly be capable of a better environment, social and physical, for us on earth. The difference, of course, and the difficulty, come in the fact that for social change, the goal is less precise and the decisions for action are handled by the American populace--a group more diverse in their skills and in their judgments of what comprises the "better life."

It is that quality of life and its concern with leisure to which we turn our attention today. And it is that very diversiveness and divisiveness of the American populace that makes easy, glib answers inappropriate, if not impossible. But we, as a profession, must search for those answers.

In a troubled world in which each day some new segment of our society is embarking on its search for identity, the park and recreation profession (and I think you are part of it, the land managers and the people managers live or die together), must come to terms with the questions "Who are we? What are our commitments? How do we fit into present or predicted lifestyles?"

Recreation and park personnel cannot operate in a vacuum. The value of our contributions will augment or recede as the physical, social, moral, and emotional environments change, but, in my judgment, the present visible outer arena has created the most fortuitous setting in which to plead the cause of our profession.

I may be operating from a prejudiced point of view but I firmly believe that, for many age groups, expenditure of leisure may ultimately condition not only the quality of life but survival itself in terms of psychological balance and physical well-being. The most potent way to produce high morale among personnel is to make it possible for them to really believe that what they are doing (however large or small the task is) is a contribution to the welfare of mankind--a contribution to life as well as to livelihood. Those in parks and recreation who believe in the worth of what they do have greater motivation than those who are still

apologetic about the image of fun and games, cultivating grass (and I am using that word in its older connotation, the green stuff that gets cut not smoked), or merely filling leisure hours.

We are confronted with an overpopulated, affluent, effluent soaked, cybernated, questioning (nothing is sacred), production oriented, work oriented, very young, success oriented, noise-bombarded, hyper mobile nation in which centralized decision making has reduced interaction at local level, in which speed of vertical and horizontal communication and transportation literally make the universe our neighborhood, and in which it is becoming increasingly more difficult for an individual to discover himself, to adjust to society, and to develop as a total human being.

In a technological world in which computers are stacking miracles like dishes waiting to be used, I am still optimistic about the impact which we can and must make as the only profession whose sole concern is the implementation and direction of the nation's expenditure of leisure.

The game of futurism and brinkmanship is increasingly more popular. I have no crystal ball which mirrors the future, but I would like to share with you some thoughts about present and predicted changes in events, ideas, and attitudes, and their implications for us in the last fourth of this restless, dynamic, complex Twentieth Century. Let us scan the unpredictable horizon, and I guarantee that our technology has so dramatically changed man's capabilities in the last few decades than any projected vision of mine will probably be much less dramatic than the realities of the future. And I am safe--for I will not be around for you to prove me wrong.

Eric Hoffer writes, "It is a paradox that in a time of drastic change, when the future is in our midst dimming the present before our eyes, we have never been less certain about what is ahead of us."

Daniel Bell, writing in The Year 2000, said, "The world of the year 2000 has already arrived, for in the decisions we make now, in the way we design our environment and thus sketch the lines of constraints, the future is committed. The future is not an over arching leap in to the distance; it begins in the present." We will not retrieve the land and water we have already destroyed. Bell could also have been talking about social and intellectual or moral environments as well as physical, for the children of today are the citizens of tomorrow. We are already at work educating them, or trying to, toward a world we can securely visualize.

The Twentieth Century has thrust upon us many changes and they have made us uncomfortable. Change shakes our complacency and demands adjustment. My husband when he reached forty said, with tongue inspired bulge in cheek, that he had solved his adjustment problems by just changing his theme song. What used to be, "Wine, Women and Song", became "Metrecal, Same Old Gal and Lawrence Welk."

Change itself is not new. It is the rate of change in our lifetime that is startling. Even 1950 was a thousand years ago if measured by the revolutions which have occurred so rapidly and so dramatically that the results have been psychologically, physically, and sociologically disruptive. The rules of the game of life used to be fairly constant. You learned the rules, played by them, and were home safe. Now, the rules are constantly dynamic, the goals are no longer static, and the environments in which the game is played are frighteningly unfamiliar.

We are expecting what Alvin Toffler has termed "future shock" which he describes as a "dizzying disorientation brought on by the premature arrival of the future."

Listen to his graphic description:

"In the three short decades between now and the 21st century, millions of ordinary, psychologically normal people will face an abrupt collision with the future.

Future shock is a time phenomenon, a product of the greatly accelerated change in society. It arises from the superimposition of a new culture on an old one. If you travel to another culture you expect strangeness, but most Peace Corpsmen, in fact, most travelers, have the comforting knowledge that the culture they left behind will be there to return to. The victim of future shock has no such stabilizing force."

Out of that rapidly accelerating collision with the future have come or will come the following real, if sometimes unwelcome, challenges.

1. The key word for the future seems to be temporary, impermanence, a minimal involvement with roots, stability, security. Change is the by-word. We have a vanishing past, a throw-away or rent-it by the day present, and an uncertain future. Let us take a few examples.

a. We level old buildings, our link with the traditional. The future plug-in, or clip on architecture will give us portable modules, easily transferrable from one set of skeletal life support structures to another. Office buildings, industrial complexes, or homes can change location at will via helicopter transplants and a familiar skyline will alter overnight, and you can play musical homes or musical offices instead of the more familiar musical chairs.

Our new shelter houses will undoubtedly be portable. Moreover, we will extend the adaptability of interiors in all of our buildings for multiple use. The so-called future fun palace in the parks may include few stationary or permanent elements with the exception of the plumbing.

I guess plumbing seems always to remain unaffected--Buckminster Fuller, writing in the American Scholar says, "No improvement other than colored plumbing fixtures, has been realized in the last 500 years in our "five

gallons to get rid of one pint" systems for shunting rivers through toilets and sewers and then back into our ever more polluted water supply streams."

b. Throw away clothes are already available. They are, however, much easier to dispose of than traditional ideas. I am not sure I can quite accept the ad for the lovely paper wedding gown which "easily transforms into great kitchen curtains" after the honeymoon. That is future shock for the gown my daughter's daughter may wear. Throw away playground and park equipment will shock those of us educated to a psychology of scarcity.

c. Rentals will increase. The people of the future must be more flexible for quick job transfers. Rentals of play equipment and recreation areas on a temporary basis are already a part of our municipal administration. Renting recreation leaders, rangers, turf managers, or consultants may evolve as communities become unable to hold a landscape architect or a planner for more than a temporal commitment.

We could find other examples, but certainly these serve to show that there is decreasing opportunity to find stable or permanent physical or psychological foundations in the predicted "temporariness" of tomorrow. We are going to have to cope with the effects of the loss of roots, the lack of long term loyalties, the search for identity and recognition in a fluid temporary world. Can we in parks and recreation help provide some counteracting stability in leisure opportunities?

2. Let us look at increased leisure. Predictions for the year 2000 indicate lower labor force participation rates--39 four day work weeks and a conservative 60 percent of the year as available leisure. We already have 700 firms with 100,000 employees on a four-day, 40 hour work week. Now we are experimenting with the three-day, 12 hour week. Look at the new GM contract. Retirement at 56? To what? The very idea of vast amounts of free time seems the realization of a dream come true--the "Utopia" that Sir Thomas Moore described centuries ago. But the retired aged of today, the unemployed and the unemployable are living indications that it takes education to become a full time member of the leisure class and we have not done the job. We will never really be able to enjoy our leisure at any age until society as a whole has accepted the idea that what one does in his leisure can be as meaningful and rewarding as what one does in his work. President Nixon did not help our case in his last November speech exalting the production-oriented life with a "job for each" as the ultimate in success or in his glorification of the work ethic in the October 30 issue of Time magazine. (McGovern--Come back America to a job). Leisure with dignity--can we make it a possible dream?

Historically, in the Greek concept, leisure was the treasure of the privileged minority, made possible by the enslavement of large segments of the population for less respectable work duties. Industrial societies made clear cut divisions in time segments between labor and leisure as they moved also to the Protestant ethic with its philosophy of the sanctity of work as the meaning of life and of leisure as a reward for having worked, on a debit-credit basis, or as a necessary means for retooling energies for work. That philosophy makes it impossible to live comfortably in a world of shrinking work demands, and expanding, unearned personal leisure.

What are you doing to change that philosophy? Is it your responsibility? If not, then whose?

According to psychiatrist Erich Fromm, the salvation of any people rests with their ability to desire those things which environmental factors require. So it is with acceptance and use of abundance of leisure. A culture which has not learned to honor what it is actually committed to produce creates an uneasy population.

3. Population explosion and implosion. In spite of the pill, and recent modifying statistics, we are increasing at an appalling rate, over 208 million now, an estimated 300+ million by the year 2000. (280, the most conservative.) We discovered death control before we could sell birth control. We are envisioning a future of coast to coast people at the very moment when we are running out of work uses for them. The kingdom of progress in goods mandates that cars, TV's, and refrigerators become outmoded to make way for the newer flashier models. Things must not last. What about people?

What of population implosion, the increasing density of population in sections of our land? When Philip Hauser talks of the density of population of Harlem (75,000 per square mile) as being great enough that comparable density would allow all 208 million of us in the U.S. to fit in New York State, one does not wonder that there have been concerns about more long hot winters or summers of discontent. Can we in recreation and parks give people a quiet spot, a respite from the input of constant stimulation in a fast-paced world? Or, will we compound the problem with added psychedelic bombardment?

4. Physical environment. The physical environment will make fewer physical demands on us as machines absorb taxing labors at work and at home, yet medical science has given us no substitute for physical exercise. There will be crowding not only in living areas but in recreation sites. Don Michael predicts that waiting in line will become the major leisure expenditure of the future (Disneyland). Depletion of natural resources, air pollution, water pollution, noise pollution will continue to be of prime concern. In the next 30 years, a second America will be laid down alongside the first, or built vertically atop it in the new cities, rebuilt old cities, etc. Do you have any responsibility in the planning for that second America?

At the same time, we will enlarge our physical environment by hovercraft suspended modules and retrieval of some of the oceans that cover two-thirds of our universe. (California research--cement encased instruments). Aqua culture and the Continental shelf will provide the excitement of a new frontier since space technology restricts drastically those it will accept in the outer world--at least until Pan Am effects its shuttle service to the moon, now being advertised. (I hear Spiro Agnew has already signed up so that he will have room for his particular brand of contact golf). But, we also may have to resort to using the air over streets and freeways for future recreation sites. Or the rooftops and the bays as Japan is already doing. Are you thinking ahead imaginatively to creative space use in your areas?

5. Changing value systems. Relaxed and changing moral standards and changing patterns of family solidarity will place emphasis on need for greater acquaintance with the behavioral sciences for park and recreation professionals. Managing the land is no problem--managing the people on the land is. Should we show as much concern for psychic as well as physical environmental pollution? The air can be fouled with language as well as with sinog.

The psychological environment already shows the human toll of cybernetics and affects the social environment as individuals at every age find fewer things to which they can be committed. Kenneth Kenniston indicates that being uncommitted to the system opens up "a society in which alienations characteristically take the form of rebellion without a cause, rejection without a program, refusal of what is without vision of what should be." The words suggest the present situation on some campuses, and in high schools as well as in the deprived areas of the inner city.

We must deal with this segment if not for humane reasons, then for political and social expediency.

Kahn and Wiener in The Year 2000 indicate we are moving into an increasingly sensate culture--empirical, this wordly, hedonistic. The pop tunes of the last few years, "Make Your Own Kind of Music", "I've Gotta Be Me", "Ain't It Great Just to be Feelin'" and "I Did It My Way" are indicative. The shock techniques on stage or screen, or on campuses of body exposure, verbal slumming, psychedelic attacks in color or sound are "in." The young naively rationalize almost any behavior with "How can anything be wrong that makes me feel this good?" That philosophy can apply to initial freedoms in sex, drugs, or speeding on the highway. I say initial freedoms advisedly for unfortunately in all three cases it takes a very short time for freedom of choice in each to be eliminated.

We have a perverted interpretation of Hamlet's "This above all to thine own self be true and then, it follows as the day the night, thou canst not then be false to any man." "Doing your thing" is a current philosophical ideal. We are at the ridiculous point in mass media when performers at every age feel they must "freak out" in some way in order to achieve any recognition in a society in which Tiny Tim, the all-time great American "put-on" (until Helga Hughes), was sought after by three channels and college campuses vie in their efforts to import speakers who preach the annihilation of the academic community. I am not so sure but what density of population has a double meaning in some communities. As a profession we need to make better contact with several generations. I cannot buy the reaction, "That's the new life style. You'll just have to live with it." That is a cop-out.

6. Mobility. We are literally a nation on the move. Instant communications and speed of horizontal as well as vertical mobility have made the world our neighborhood. Geographical populations are no longer stable. The security of life-long neighborhood relationships is no longer available to many Americans. Migration leaves the elderly behind without family or brings the young adult into new communities where strange faces and strange

places jar his quest for wholesome leisure pursuits. Commitment seems to correlate with duration of relationship and our fluidity allows few permanent loyalties. Can we in leisure get people back together again as people?

7. Emancipation of women. "You've come a long way, baby!" Perhaps one of the most dramatic changes in the Twentieth Century is the physical, social and intellectual emancipation of women. What makes a particular challenge for us as a profession is, I believe, the influence of today's housewife as the leisure manager of her brood as she is involved in car pools, engagement books, choices in home architecture, eating schedules, or as financial reports indicate, control of the purse strings. I cannot resist adding here that changes are occurring not only in male-female roles but in their outward appearance. I still long for the "good old days" when if you posed the question, "Is that a boy or girl?" you were referring to a baby. Let us not merge male and female roles--just men and women. We are overreacting so badly in most of our programs that about the only place where you can be sure of your sex role is the restroom. I would like to provide some other sanctuaries where we can be men among men and women among women.

8. Education. The environment for educational opportunity in the future will be less restrictive in geographical, institutional, and age limitation. Already the park areas have become free educational arenas. Education must become the real key to freedom of choice, development of attitudes and tastes with which to make suitable options. But the knowledge input and social environment may be manipulated by the power structure which determines what knowledge who will receive and which kinds of people will be allowed to be born or be saved from death in the new mathematics of mercy. We had better get more politically astute to take a role in that power structure.

The task of the educator is to prepare students for a future which we can barely conceive, but into which we are being hurdled at a breathless pace. The world of tomorrow will be a consumers world. Not the least of our obligation will be education for intelligent consumership in leisure, an area still relatively foreign to Ralph Nader, Mrs. Knauer or Betty Furness. Education must reflect the culture, but it also has an obligation to direct and to shape it. We must move farther along both paths.

9. Technology. In spite of incendiary verbiage about the perils of technology I doubt that anyone is going to turn it off. Here are some predictions in technology which are both alarming and exciting. They certainly will affect us in our plans for making leisure meaningful in the years to come.

a. The power to control the mind. Chemicals for memory erasure, mind modification, memory editing, brain operations to eliminate aggressive reactions, raising or lowering of intelligence levels, anti-hostility agents in the water to create a peaceful population. Great for stopping riots or insuring bond issues. It may be perfectly possible not to have survival of the fittest but fitting of the survivors to the available environment that is left to us.

b. Creation of higher forms of life in a laboratory. Supermarkets for shopping for embryos of your future children. (Wonder if there will be TV commercials with comparisons about Brand X?) Compulsory birth control, central governmental control of family size, pre-determined sex and personality traits, extension of the life span as well as prolongation of youth, interchange of body parts.

c. Creation of inexpensive robots or humanoids. Implications--what is a human? How many mechanical organs can you receive before you cease to be a human and become a humanoid and lose your voting privileges in a democratic society? Will the mechanical men vote your future bond issue or budget? When our adolescents of the future face the question, "Who am I?" will they find ready answers on the "content blurb" of their original embryo package? Then without a unique identity, how will they express themselves in work or leisure?

d. Deep freeze--for lowering food intake in times of famine or because of free choice to store away to see another century or simply deep freeze the overflow on the park systems and waterways.

e. Control of weather and climate--if they vote to have rain twice a week, I am moving.

f. Console computers as common as desk calculators, and capable of beating you at chess, creating music, or monitoring your crowds at parks (Satellite-Lake Monroe-Law Enforcement) or isolating words in conversations to predict riots before they happen.

g. The piping in electronically of most human needs into the house so that the only reason for either physical activity or social stimulus to leave the house may be our responsibility and ours alone--something exciting enough to inveigle people into healthful exercise or intellectual activity.

h. The machines already in experimental stages to promote alpha waves and biofeedback units. (Life Magazine last spring). Can we find other ways of promoting serenity in tomorrow's world?

Can we get involved as innovations are made with

a. Year round schools - NE - 4 day school.

b. Playgrounds in the sea.

c. Play modules that are created not by park and recreation professionals but by student architects.

d. Unmanned machines for groundskeeping.

e. Can we continue to remain aloof as new commercial ventures try to meet changing needs of the over 35's, the swingers, the singles, etc.?

What's ahead for us? How do we adjust our goals? How do we cope with present inequities and plan for adjustments to a future we can scarcely conceive?

I would like to suggest that personnel are frequently divided into three categories. (1) Those who make things happen, (2) those who watch things happen, and (3) those who wonder what happened. Is it too disloyal to say we frequently find ourselves in parks and recreation in the second and third categories?

We must be able to anticipate coming problems in order to create possible solutions. If future leisure is going to be rewarding and the leisure job does not get wrested from us by more enterprising souls (sociology, medicine, and the clergy have already made inroads) then we need a think tank for our profession at both state and national levels, a Council of the Future. We need men and women whose assignment is to predict so that we can prepare. Changes are coming too fast to try to adjust at each time of change. We will be constantly off balance. We keep finding new ways of plugging the holes in the dike. Maybe we need a new dike. Could we instigate our own Delphi exercise? Do we need to take a page from Edward de Bono's New Think book and start digging new holes instead of enlarging old ones?

Can we explore, believe and interpret to others our case for recreation, our worth in future environments to include:

a. Recreation outlets as a chance to find meaning and self-expression in a world in which the absence or the frustrations of work make creativity less available.

b. Recreation as a means to restore balance--social, mental, physical? Research has given us good support in the areas of recreation's value in maintenance of physical health and psychological well being. Its contribution to social integration is less well documented scientifically, but observation gives us ample evidence of the merging of socio-economic or racial groups as they become mutually accessible in the theater, on the ball team, or on the lakes and streams.

c. Recreation as opportunity for involvement in life's issues particularly for those whose age (teens and aged) narrows their choices in identity in meaningful roles. Let us accept involvement in political and social issues as service recreation.

d. Recreation as the chance for self-realization or self-actualization. What do you give to the man who has everything or nothing? You try to add meaning to his life.

e. Recreation as a practice ground for better understanding of others and through that understanding a better community spirit. I am my brother's keeper.

f. Recreation as an opportunity for voluntary exciting learning.

g. Recreation as a basic human need, as real as the need for food, and shelter, if man is to truly live, not just exist.

h. Recreation as a chance for adventure as exciting as an LSD trip. (Shoot rapids--heroin).

i. Or for the hard-headed business man, recreation as an important key to economic balance, an 83 billion dollar business, recreation as a means of attraction and retention of community residents or business. Is it enough to use just fun as our objective in a society which has not learned to accept fun as a prestigious goal? Let us be sensitive to changing roles and needs of various age groups.

Can we help teenagers use their energies on just causes; offer opportunities for service and recognition; have faith enough to give them a "piece of the action?" The 18 year old vote may help to make those decisions.

Can we identify the young adult and communicate even though he is not institutionalized? (Most neglected group).

Can we help to give middle-aged a respectable role so that with security they can stop trying to hold on to adolescent values? A prominent sociologist says we have no generation gap with teenagers because their parents in words, appearance, and action are trying to remain teenagers.

Do we have a generation gap at the upper end of the age continuum as severe as that which we are experiencing with our young people? America is the only nation where we put decision-making in the hands of youth and tell the elderly to go out to play. Is it just possible that we could be headed toward senile delinquency in a bored population of aged who feel unwanted in our "payoff" world? A world which has not yet accepted leisure outlets as major social contributions. Getting older is not really too bad when you consider the alternative--and look what it did for Aristotle Onassis.

Do we need to re-evaluate program offerings in an overpopulated environment? Do we need to be more creative about programming which will allow for individual escape from people as well as social integration? Can we deplore the depletion of natural resources and diminishing land available and continue to try to build enough campsites for everyone to use on a two-day weekend? Or fairgrounds that sport the county fair for all of two weeks a year? Can we see our way clear to giving as much prestige to recreation available in the city so that the individual who cannot escape from his urban environment may not feel cheated or inferior or that he has lost his heritage or even his soul if he cannot be a traveler to nature's finery?

Do we need specializations in professional preparation? Can one umbrella curriculum, educate land managers, researchers, leisure consultants, supervisors, administrators and face to face leaders in a variety of settings?

Can we resolve the hierarchy in our own professional snobbery of executive, researcher, turf manager, leader? When we get too disdainful in our outlook, remember John Gardner's admonition, "We must have both plumbers and philosophers. Unless we provide quality education for both, neither our pipes, nor our ideas will hold water."

Will our recreation programs of the future stimulate exciting physical movement in a world which demands little mandatory flexing of muscles in daily life? Even Texas teenage boys do not run after girls any more unless it is downhill. Will we provide outlets for creative expressions in a cybernetic environment? Will we provide a continuum of activities to provide balance in an emotionally tense world? Will we plan ahead for space in a country of exploding population? Will our opportunities allow for social integration? Will they afford satisfaction of basic needs such as new experiences, security, aesthetic outlets, inter-relationships with others? Will they allow space and time for a quiet retreat from the teeming crowd?

The recreation and park profession is the only profession whose sole purpose is involved with man's expenditure of leisure.

But the leisure world of the future will demand creative professionals. We need to prepare with imagination but perhaps too, with a girding of our loins and resources.

If we succeed in selling the idea that leisure is as prestigious and rewarding as work, then do we have an obligation for standards, or "will doing your thing", regardless of its destructive side effects, be acceptable? There comes the very real problem of who pays to give each the opportunity to do his thing. Do we condemn parasitic living and who defines the parasite? For some he is the hippie, for others he is the retiree, or the welfare recipient.

We are living in times subject to change without notice--but we are noticing. Today is a time of testing for our profession. Too many of us are like Johnny (heaven). We need to make up a load right now.

In this mobile, highly populated, work-oriented, leisure blessed society, are recreation and park personnel needed? Why? Will we be needed in the year 2000? There is always a temptation to look at the magnitude of the challenges and feel that we can do little about them, to feel inconsequential and thus immobilized. If each of us could light just one little candle what a bright profession this would be.

The urgency of the situation brings this story to mind.

Marshal Lyartey in Africa asked his gardener for a certain tree. The gardener said, "This tree will not reach maturity for two hundred years." The Marshal replied, "In that case, there is no time to lose. Plant it this afternoon." We may not live to see the rewards of a quality job from

our park and recreation personnel today but I strongly believe we have a role to play in making a better world--a finer 21st century. We have the resources in this country to do anything we want. What do you want for the future? Are you making personal and professional plans?

I started with the astronauts. As a sailor, let me end with this marine four-liner:

If a mariner's wise he looks to the skies
To see what he's about
And he doesn't expect any ships to come in
Unless he has sent a few out.

Where is your fleet of ideas today? Buffeting the waves--or still on the shore?

TRAINING FOR EFFICIENCY

J. Alton Enloe
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University of Houston
Houston, Texas

As I stand before you this afternoon to discuss "Training for Efficiency" and notice in our midst a number of professors who taught me and many of you the fundamentals of agriculture, I am reminded of a time just a little over 20 years ago when I stood as a young second lieutenant in front of a group of old World War II soldiers which included one full colonel, one lieutenant colonel, one major, two captains and one first lieutenant to teach them how to disassemble and assemble a carbine, a weapon they knew all too well and I recognized. Period! The man who planned that training session must have had in mind my efficiency as well as that of the older group of officers who perhaps needed refreshing but not new training on that particular subject. You can imagine I did learn much about the carbine in that brief period of time. Likewise, and for the same reasons, you can bet I am sure going to listen to what I have to say about training this afternoon. I gratefully accepted the opportunity to address an audience filled with members who are past masters in the art of training because I am firmly convinced that never before has the need for efficiency been greater than it is today. All of you in middle management know that our Federal Government is asking us to do in a few short years what we Americans have collectively failed to do since the Civil War. It is nice to work for an employer who claims to offer equal opportunity for all races. It is equally nice if the employer is capable of financing the needed training this particular philosophy might precipitate. Since more and more employers are joining the EOE band wagon because of our Uncle Sam's heavy-handedness, I suggest to you in middle management that, in fairness, you have every right to ask for more training to overcome real or imagined burdens you are being asked to bear. In this area I would urge you to review your own attitude, a characteristic in all your employees which is basic in all training programs geared to efficiency. If your attitude is wrong, it won't merely permeate your organization by osmosis--it will inundate your program like water flooding through a broken dam.

Then (or rather should I say "now") we have OSHA! Now, how is your attitude? Do you find the OSHA Cowboy amusing or do you agree with OSHA officials and safety and supply companies who claim,

"Safety does not cost--it pays." Are they talking about human life and well-being, economics and/or efficiency? To survive the economic impact on your budget of new safety equipment you should increase, not decrease, your training budget to overcome some obviously cumbersome additions to your daily operations dictated by OSHA. OSHA is here to stay. If you plan a like sojourn, you will need all the "Training for Efficiency" you can get. Obviously, we can't cover all aspects of training this afternoon. I would like to cover some key areas that you should address with all the expertise you can muster, if you are not operating at what you consider a theoretical maximum for your operation. Perhaps you are, and everyone's tongue in your organization is hanging out just about right to suit you. If that is the case, you should be up here instead of me. A classical case of inefficiency in my own life is on record right in your printed program. Anyone who has ever heard Dr. MacLean speak before (and I have) and manages a spot on the program just following her presentation, has to chalk up one to bad timing if not downright inefficiency! Then, there is that program on OSHA just following this presentation. After my earlier remarks about this program, my OSHA Cowboy will need some "no-shoot-'em-out-of-saddle" glue to keep him mounted when that subject is completed today. This coincidence reminds me of the story of a football team which was behind their opponent at half-time. During the half, their coach gave them such a pep talk that they attempted to run through the gate back onto the field at the start of the second half; three star players ran together; were injured; and their team still lost. I suggest to you that even if you are able to motivate people like Dr. MacLean, you still have some logistical problems such as a need for wider gates or a more orderly progression of your people! In addition, "Safety can pay, instead of cost!"

Several things can be accomplished under the heading of "Training for Efficiency." Your approach should naturally be based on the size of your organization. For small organizations and autonomous units of large organizations, four needs stand paramount in my mind.

Small Organizations - I have already mentioned attitude. You all have heard about the old dean of agriculture who confronted the young lad who indicated that he did not feel like doing a particular job. Most of us smile at the comment, "half of the work done in the world is done by people who do not feel like doing it," because down deep we believe we all could do more if we set our minds to the task at hand. Attitude is a habit that affects all areas of life. In fact,

I have tried for a number of years to convince my wife that "half of life is attitude." Lately, I believe that she has begun to believe this suggestion. The classical case of this characteristic at work in an employee's life is when he or she gets "revved up" for a job at home. Everything is "go" from the time they finally get at the job until it is finished. I'd venture to say you are not going to get such effort on a day-in, day-out basis from paid employees. But you can get them to identify with your organization so that they take pride in accomplishing for you. I know many of you would suggest the need for heavy-handedness or periodic reminders of where the bread comes from (and indeed this is necessary and effective), but it will not promote the positive attitude that "Training for Efficiency" properly conducted, could engender in your employees. Attitudes are like clay. The forms they assume in your employees depend, in part, upon your skill as a potter of people.

A second obvious but often overlooked necessity is doing. There is simply no substitute for "tool-in-hand" experience. This process activates all the learning senses in your employees and will help them understand the theoretical fundamentals you will sooner or later try to get across to your help.

You can develop the best of attitudes in your workers and teach them all the proper techniques, but find your forces lagging when you get a new job or repeat a repetitive one if you fail to get them started. Getting started integrates logistics, motivation and all the other factors included in efficient operations. Procrastination is extremely detrimental because it lurks in the subconscious to create dread of imagined difficulties and entangles your present operations, broadcasting inefficiency in all directions. Cut the procrastination. Get started.

Finally, it is important to set reachable goals for yourself and each of your employees. I personally feel it is time well spent, when having reached a goal or finished a job, to momentarily pause and reflect upon the accomplishment, minor though it be, before tackling new projects. There is something in the human spirit and/or physical makeup which needs this momentary pause which so refreshes. Again, I suggest this is time well spent in "Training for Efficiency."

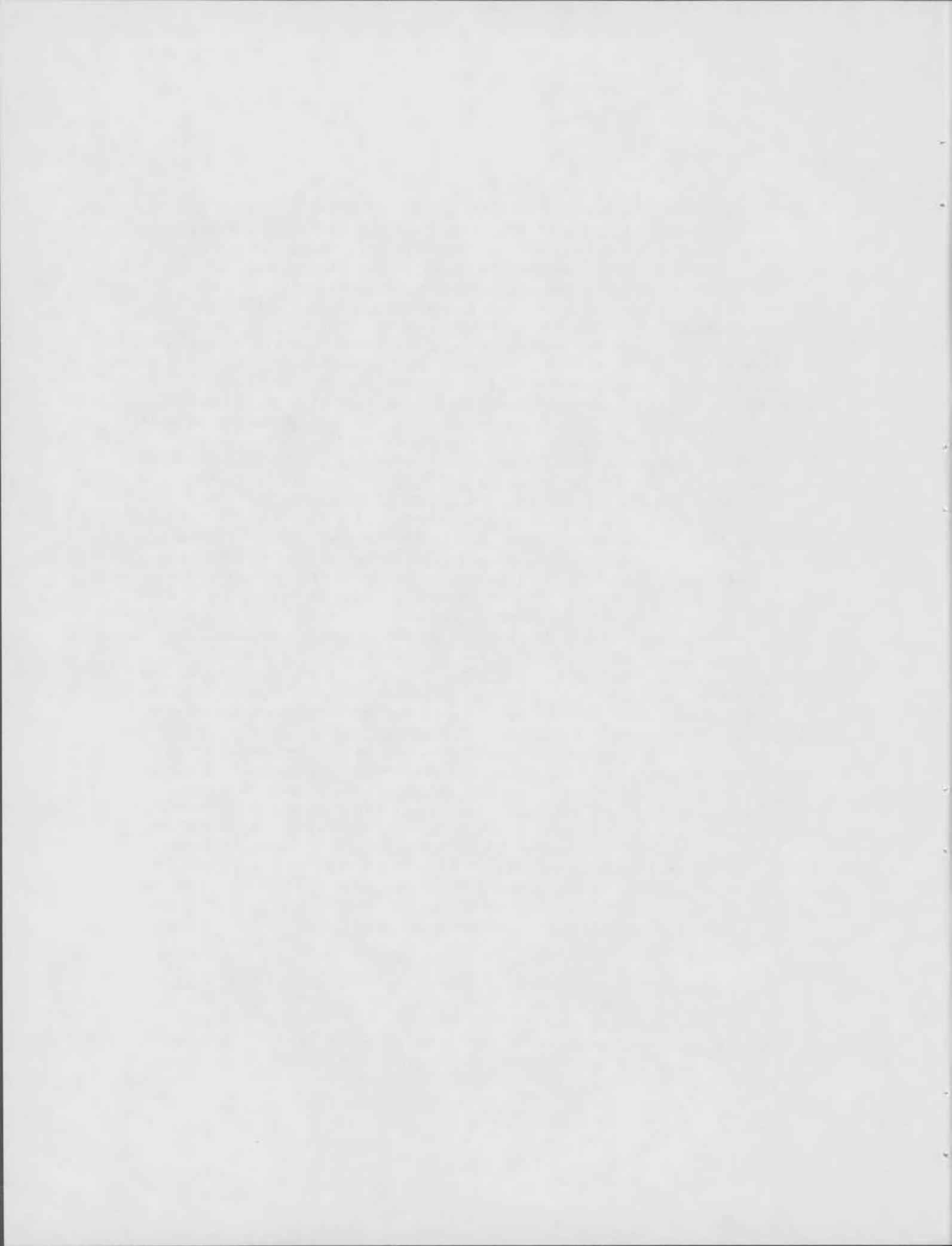
Large Organizations - When considering organizations involving more and more people, structuring of personnel and equipment within your organization becomes inevitable. An exact division of labor in any organization is probably an impossibility, but I suggest to you that you spend all the time you feel you can afford in organizing your people. Then,

while continuously reviewing your program, work hard to help each group and their leader understand their role and their interaction with all your other groups. This work on your part could be called "Training for Efficiency." It is necessary if you hope to keep all groups functioning without friction.

Three attributes form a precarious balance you must maintain for the greatest efficiency in your organization. These attributes can be best described by 1) adaptability or flexibility, 2) autonomy and 3) conformity. It is necessary at the outset of the deliberations needed to delineate duties among your employees (while you are vigorously promoting jobs you hope they will identify as their own) to keep the door ajar so that when employees are needed in other areas of your total endeavor, no real trauma results, with subsequent effects on the efficiency of your operations. In other words, maintain some flexibility. Likewise, you should promote autonomy among your crews. By autonomy, I mean the ability to decide matters that affect the specific area of assigned responsibility. Give your lead men some latitude. Of course, they need checking, but they need the "go" signal worse. In some employees, it is necessary to remind them regularly of their place on the team. Proper training will help them understand the need for this conformity. Every employee must recognize the limitations of his superior; likewise, bosses should perennially reappraise their expectations and considerations of what is or is not efficient. What about work quality? Considered on a day-in, day-out basis, your employees may be operating at a higher percentage of efficiency than you realize. Could you stand the pace we tend to expect because of our weekend groundskeeping operations at home? Just getting to and from a job in organizations such as we have in the Grounds Department at the University of Houston is such a chore that, once on the job site, our employees' performances deserve, in my opinion, a pretty fair rating. Under such conditions, the foremen of crews I would like to show you on our Videocorder hold the keys to whatever claims of efficiency we make. These individuals are the employees in our organization who decide how far down any particular workrow our people will get by sundown. If one lead man habitually decides on shorter or fewer rows, we multiply his inefficiency by the number of people in his command. I do not believe you can overtrain these lead people in ways and means to increase efficiency in your organization. When you convince these same lead people that poor logistical support of their workers is a reflection upon themselves and not the workers, you have come a long way toward increasing your efficiency without requiring superhuman effort on anyone's part.

I learned in a rather primitive sort of way a long time ago the value of conformity to good team work and increased efficiencies. When I was a boy, we occasionally split fence posts from white oak trees growing near the heart of the Big Thicket. I shall always remember the training the old wagon master thought necessary for his two-horse team. Bob was a black, lank, high-strung horse Mr. Jones always hitched on the left side of the wagon tongue. Joe was dun-colored, slightly heavier and steady as a rock. On the way into the woods during some rather wet weather, Mr. Jones considered it necessary to cover the same ground empty that we would traverse with a load of posts later that afternoon. I am sure he did this for his own education as well as that of his two horses so that he would know about how many posts we should split and load for our ride out of the woods. There inevitably appeared two or three bad bogs that we had to cross. I can still see the old educator in action as we approached these places empty on the way in: As we approached a bog, the old man would begin checking both horses with his leather reins. Then while still checking both horses, he would begin hollering, particularly at Bob, simultaneously popping both horses with the ends of his reins. Needless to say, he got their undivided attention and they surely recognized the spots of potential trouble on their way out. I wondered aloud if all the fanfare were necessary. Mr. Jones explained that after negotiating the bogs empty, he could make a better judgment of the size of an efficient load for our return. At the end of the day as we started out with our load, I understood why both horses needed all the training he had given them on the way in. Joe was tremendously burdened as the wagon moved haltingly through the mire. His load was made worse by Bob, who variously lunged against his collar and jumped in and out of his traces, causing his single-tree to pull unevenly at best and not at all at times. Mr. Jones' goal to keep Bob pulling steadily against his collar and inside his own trace chains was never reached completely, but we never got completely stuck so that we had to unload and go home empty, either. Mr. Jones still maintains that if he had not trained his horses for efficiency under these adverse conditions, we would not have been so successful. I agree with him. If you can train your people so that they function smoothly during seasons of rampant activity, they will hold their own the rest of the time.

A good horse has powerful legs which allow him to walk away with a 550-pound load at the rate of one foot per second. The horsepower in the Grounds Department at the University of Houston is distributed among seven basic crews: 1) lawn care, 2) shrub care, 3) tree care, 4) plant care and nursery operations, 5) auxiliary services 6) new facilities and 7) equipment maintenance.



TRENDS IN TURF LABOR

James R. Fulwider
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White Plains, New York

A few weeks ago, a somewhat small article appeared in TIME magazine under the caption, "Rising Club Handicap," which many of you may have read. For those of you who did not read the article, I thought it was pertinent enough to the message I will attempt to get across here today, that I would briefly review some of their information. The purpose of the article in TIME was to point out a sign of the economy, particularly after a recession. Although the size of the handicap varies widely from club to club, the indication was that the country club business was not as good or was not advancing as well as most service enterprises. A survey of 75 clubs by a large Manhattan accounting firm showed that the membership which had been on the rise for 17 straight years went down about 1 percent in 1971. Faced with this slippage some clubs have relaxed their restrictions and pushed aggressive membership drives. A few have even closed.

Of course, there are many clubs that have no financial problems, and others, the sheer prestige of belonging, keeps waiting lists long at the small group of old money clubs that exist in every big metropolitan area.

They also went on to say that on the other hand, many clubs are caught in a squeeze between soaring costs and the amount of dues that members are willing to pay. According to the accountants' study, the bill for maintaining a golf course in the metropolitan area jumped 9 percent last year to \$5364 for each hole, and has nearly doubled in the past 15 years. Paradoxically, rising land values have brought disastrous increases in taxes on many clubs, particularly in states that levy especially large taxes on land that is not being put to the best use recommended in local zoning plans. I live in Purchase, New York, and the Purchase Country Club, which is a mile or so down the road, had an increase in property taxes from \$6,000 to \$218,000 in the last ten years. Great variances in taxes can exist between nearby towns or cities. Century County Club (by whom I am employed) paid \$31,000 in taxes in 1963 and \$106,000 last year. Be that as it may, the whole point is that costs are soaring and this includes labor costs. This is where we as superintendents get directly involved. Increased overall club operation costs are

naturally scrutinized by club officials, and one of the categories they are sure to look at very carefully is how they can cut down on labor and maintenance costs of the golf course.

So, I think we all have labor difficulties ahead of us to some degree whether we are golf course superintendents in Maine, metropolitan areas such as New York City or in the Southwest, such as you have here in Texas. Each locality will have its own unique problems, trends will develop and operations will change from time to time. Superintendents will have to adjust to the situation.

Few people will argue that labor management is not the most important aspect of a superintendent's job. A look at the greens maintenance budget points out very clearly that approximately 65 percent to 70 percent of the total budget goes for labor. This means that he is under increasing pressure to maintain his golf course in the most economical manner. This is the way it should be. This is what a golf course superintendent gets paid for. This does not mean, however, that he can let his maintenance deteriorate just to save money. I believe very strongly that the outstanding golf course superintendents of today are successful because they can manage labor. But these same successful superintendents can not do the job if they do not have good employees to perform the work. Obtaining good employees, training these employees and keeping them contented are all key factors in good labor management. An employee who feels he is underpaid is not a productive employee, and a superintendent who is restricted by an inadequate budget is in difficulty. So a superintendent must constantly demonstrate that he is putting club funds to the best use and also be constantly trying to sell his club officials that they must provide adequate funds for labor. This in turn makes it possible to obtain workmen who can properly meet the job requirements of modern-day golf courses. Modern equipment is of little value in the hands of an inept operator.

Bob Williams, a well-known superintendent in Chicago, once said that he thought for many years the superintendent had been his own worst enemy with labor by trying to keep wages and budgets to a minimum and also that we had been guilty of failing to face reality. The resulting depletion of good course maintenance men made it doubly hard to produce a good working crew. He went on to say as superintendents began to upgrade pay scales, working conditions and fringe benefits, the problem became less acute.

Not too many years ago many clubs in our area, including the one I work for, had as many as 12 to 14 men performing strictly maintenance work. Rising wages brought on more labor-saving equipment.

Newly constructed golf courses were built that permitted this type of equipment to be used, and some of the old-time courses were modified, with labor saving maintenance operations in mind. But, of course, machinery does not run by itself and the old timer that could perform only hand work had to give way to better operators. Now, 7 to 8 men (and they certainly have to be more skilled and better trained) are maintaining the same golf courses that had 12 to 14 men before, simply because higher wages forced the change. I am not sure this is for the best, when we know how much wear and tear of the golf course is caused by more and heavier equipment, but I am afraid this is a fact in many areas.

I am not sure whether having a good mechanic and foreman or assistant is a trend in golf labor, but in my opinion, it should be. With more sophisticated machinery to maintain than in the past, a good reliable mechanic is a "must" now on any golf course maintenance crew. To me, the mechanic is more of a necessity than the foreman or assistant. If the modern golf course has expended a great deal of money for equipment, that equipment is expected to perform. I cannot think of a greater waste than having expensive machinery sitting around in the maintenance area for need of relatively simple repairs. Dull or poorly adjusted mowers do not help the looks of a golf course either. So, I think we could say that there is a trend towards retaining more reliable and capable mechanics. The dependence on more and better equipment has made this absolutely essential. I have made every effort in my particular case to be sure that our mechanic is kept reasonably happy and contented, not only for the club's sake, but my own.

Most superintendents have foremen or assistants, and I won't say much more than that I think they are a very important cog in golf course management. If one has a good foreman or assistant, he is usually a very reliable man and this is one less crewman that you have to worry about.

Fringe benefits for golf course employees have improved along with increased wages in the last few years. This is the result of more clubs having to compete with other labor markets. An article in the USGA Green Section a couple of years ago brought out the fact that country club operations were well behind that of industry as far as paid holidays, sick leave, insurance and medical benefits, but are better than they were--at a great increase in cost to the clubs, I might add.

Changes that occur in one part of the country do not necessarily have to occur in another, but labor practices that may start in some areas many times do spread to others. I assume that union labor on golf courses in Texas is rare; and if this is true, the one big difference in labor management between the New York metropolitan area and this area would be working with unions. I do not think all of you here could entirely rule out the possibility of union help on your golf courses in the years to come. The thought of union labor might be a fearsome thing to some, but I will attempt to point out some of the good and bad points of managing union labor and why unions found their way into country clubs.

Union labor at Century Country Club and many other country clubs in the Westchester-New York area is not new. In fact, we have had union labor both inside and outside the clubhouse for 20 years. You might ask how or when do unions become a part of country clubs.

If you look around today where unionized labor exists in golf course operations, I think you will find them in the metropolitan areas where the cost of living is higher and wage competition is greater. Union labor did not start on golf courses simply by chance. It started because the country clubs were not willing to meet the demands of the labor market around them. I don't think you have to go back 20 years to see that wages paid on golf courses were so low it was almost a crime. There were no such things as disability insurance, hospital insurance, life insurance, sick leave, retirement or extra pay for overtime and holidays. And if you take another look around today, you will still find areas where employee benefits are missing and lower than adequate wages prevail. Out of situations such as this, union labor could arise, just as it did in the metropolitan area 20 years ago. I don't want to leave the impression that all country clubs will be unionized. There are several clubs in my area that do not have union labor, but I want to point out that those not unionized match or exceed all the wage scales and employee benefits that are in the local union contracts. Clubs that do this save money in that they do not have to pay into the union welfare and pension plans. In our area this amounts to \$37.50 per employee per month. They also feel they have a little more personal control over their labor force.

Working with union labor, except in some isolated cases, is really not that much different than non-union labor. In my case, I have had no trouble with men refusing to do work that does not

fit their job description. However, a troublemaker could make things unpleasant, but this sort of thing is very rare. Probably the most troublesome thing that could happen is when an employee needs to be dismissed for some reason or another and he disagrees. The union protects the employee in this area and the cause for dismissal must be very real and justified, but this is how it should be. However, once in a while the deadbeat, unfortunately for the employer, is overprotected. Good relations with the union delegates is very beneficial when matters such as this arise. In our contract there is a two-week grace period for a new employee in which time the employer can judge whether or not to hire him permanently.

There are some advantages in working with unions. First of all, you don't have to quibble with the employee over their wages because it is all set by the union. A contract usually runs for three years and the employee knows exactly what his wages will be for that period.

Another advantage of union labor is that it permits the superintendent to compete in the labor market. Even though the wages received by golf course employees in my area are still lower than those paid by construction companies and other related industry, it is still high enough to compete. As mentioned earlier, a superintendent cannot maintain his course the way he should if he doesn't have good reliable help. In areas where labor competition is great, union labor may be to his advantage.

Inflated costs in all maintenance categories (chiefly labor) are forcing many superintendents to take a hitch in his belt and face the reality that he must do a better job in labor management. This means he may have to make some adjustments, such as using triplex greensmowers when he would rather use small mowers, or cutting more areas with gang mowers where contouring will permit and omitting some of the manicuring around greens and tees. Good communication between the superintendent and club officials will be more important than ever when these adjustments are made.

An example of an adjustment (or more rightfully called a change in maintenance) was experienced by some superintendents in our area this past season. The union contract expired on June 1, which included four hours' guaranteed overtime in a 44-hour work week. The new contract raised the hourly wage 50 cents per hour, but omitted the four hours' guaranteed overtime. Although the superintendents objected, many clubs forced them to reduce their Saturday morning crew to two or three men. Changes had to be made.

Traps were completely raked on Friday (usually with mechanical rakes) and not raked on Saturday. Many of the other little jobs that are usually done that day were omitted. In most cases, it was the club officials' wishes to accept less maintenance for the sake of saving labor costs. Of course, only the clubs with triplex mowers could cut their greens on Saturday--just another case of labor-saving equipment replacing manpower.

One difficult problem that has come out of crew reductions is getting spring and fall work done which is not just routine maintenance. We superintendents in the north are more fortunate than those in the southern regions in that we have a reduction in play and cold weather that slows the growth of the grass in the fall. This combination allows us to do our non-routine jobs at that time, but we still have the problem of a small fall crew and a deadline to beat, which is snow and cold weather.

YEAR ROUND MAINTENANCE OF BERMUDAGRASS

James B. Moncrief
Director Southern Region
USGA Green Section
Athens, Georgia

A 12 month maintenance program of bermudagrass greens in Texas should definitely be clarified as to the part of the state referred to. You will have to agree it is a long way from Dallas to Brownsville and the climatic conditions are completely different. In the north portion of Texas, including Dallas and Ft. Worth, new courses probably will be using bent greens more than in the past. With more know-how by the superintendent, and modern technology, properly constructed greens should support bent without too much difficulty.

There are some important factors that should be considered if there is to be a good putting surface the year around, and you must start with a superintendent. Good superintendents are an important investment for a country club; however, he should be backed by a crew he can depend on and in some areas, employment for a golf course is very competitive. More women are now working on golf courses where men for the jobs are scarce. Modern equipment can be handled easily with power steering and hydraulic controls.

Superintendents should definitely keep up with the latest techniques in research which he can do through local meetings and turf conferences, such as this one at Texas A&M and the Field Day during the summer. Probably, from turf research, we will be doing things on greens in the next 5 years that have not been considered today.

Home is hard to beat and each country club member likes to show his guests his attractive clubhouse and definitely the greens when they are at their peak. Most members judge their course by the color and sometimes it is a chore to keep grass at its peak at all times.

When we consider maintenance of a bermuda green, we take for granted that it has been properly constructed. The turf manager will grow grass on greens he has either inherited; he has constructed, or have been constructed for the country club. There should be a uniform mixture throughout the greens soil media being sure to have good drainage under the greens for better control of water. Greens are being built today where the soil media is not uniformly mixed but has layers in it that are not desirable to grow grass.

Another very important factor in maintaining grass is good water and a good irrigation system. Since we are in early winter, at the time of this turf conference, greens have already been overseeded, except maybe in the extreme Rio Grande Valley, which will probably not be overseeded as the grass will be off color such a short time. By manipulation of nutrients, overseeding can be minimized in the Valley.

Further north where overseeding is necessary, greens should be maintained so there will be minimum denuding of excess grass and vertical mowing should not be severe enough to create rows. In many instances, rows are created in greens where the verticut has grooved the grass and seed sprout creating rows which definitely affect roll of the golf ball.

It would be advisable that seed be treated with a fungicide. If seed are not treated, then a strict fungicidal program should be adhered to for the first 3 to 5 weeks while establishing the overseeding to prevent dampening off diseases thinning out the cool-season grasses.

Many bermudagrass greens that are covered with shade during the cool-season months will have a poor transition in the spring and will demand a very strict maintenance program for bermudagrass coverage in the spring. Bermuda does not do well in the shade, especially when it is being mowed at 3/16 inch.

It is important that equipment be kept in excellent operating condition at all times for a clean cut of the leaf blade whether it is cool-season grass or bermuda. Handling of equipment on a green in many instances will determine the type of putting surface. An operator of a greens mower can often determine the quality of a putting surface throughout the year.

During the winter months, cool-season grass sometimes will be eliminated by fairy ring or some other fungus that might be active. Aerification at least 12 inches beyond the circle and heavy rates of fungicides will usually reduce the fairy ring. Aerification helps break down organic material which is necessary for the mycelium to develop.

Most diseases on bermudagrass develop when wet weather prevails or water practices are not correctly handled. Fungus must have moisture to survive and, if it is possible, the greens should go into the night in a dry condition. Preferably watering should be done early in the morning; but play, availability of employees and type of irrigation system will dictate time of watering. Use of automatic irrigation systems should enable the superintendent to water when he pleases unless the course is in a housing development and time of irrigation may be dictated by water pressure and availability of water.

In the past, pathologists thought that only 3 or 4 Pythiums were causing problems with grasses, but a survey across the south has shown at least 22 species of Pythium attacking bermudagrasses. Some of these Pythiums can go from the resting stage to the very devastating stage within 55 minutes if all conditions are favorable. Be sure to have good spray equipment available with at least enough fungicide to spray 2 to 3 times to control the disease.

Well maintained spray equipment will do an excellent job when properly managed. Often we observe power equipment distributing chemicals, fungicides, herbicides, and insecticides, on greens. Many superintendents say they would not allow spray equipment to cross greens, but with low speeds, wide tires, and proper calibration, much time can be saved by using power equipment for spraying greens. Regardless of equipment used, be sure it is in excellent operating condition.

Many conditions can exist on a putting green and you have probably heard the term "fluffing" which results from fertilizer accumulating in slightly depressed areas causing the grass to become unusually green. More frequent mowing may help to minimize this; however, topdressing will fill in the low areas to reduce fluffing of the grass.

Another condition that can exist in new greens is a "swirl" causing a circular pattern, but this is not often observed in bermudagrass but is seen more in bentgrasses. This can be minimized by regular grooming practices normally carried out on a bermuda green.

"Thatch" is a word commonly used around greens. There have been many late discussions on thatch and the definition can vary. A layer of dead, undecomposed leaves and stems which accumulate between the soil and turf in most cases is termed as "thatch". This condition can restrict roots and make the grass very vulnerable to diseases and insects. The turf is spongy and the green is quite slow when putting. This condition can be minimized by aerification, dethatching of the greens, use of a vertical mower, and more restricted use of nutrients.

Grass undulation does not usually exist on bermudagrass greens, but sometimes is an area the mower missed or bridged over a slight dip in the putting green permitting the grass to grow taller. This can be reduced by topdressing and should not exist very long.

Another commonly used term describing greens is "nap" or "grain". Grain is a tendency for the grass to grow in one direction and if the green is near the coast, the grass will grow with the prevailing wind and the direction of the flow of water on the green. The ball will travel faster with the grain and slower against the grain. This can be minimized by brushing, combing, or vertical mowing the grass to keep grain to a minimum.

"Mat" describes grass that is not mowed properly and which may run in several directions to form a blanket throughout the putting surface. This can develop when brushes and vertical mowers are not used properly to keep the excess clippings from accumulating on the greens. This condition develops more often in bermudagrasses than in bent.

An ideal bermudagrass putting surface has a very tight turf consisting of thin, upright leaf blades densely grown and closely cut. Usually 3/16 to 1/4 inch is ideal for the best playing conditions. Many factors can affect the height of cut.

A constant grooming program is necessary to obtain a superior putting surface. In many instances when aerification equipment is used, there will be green grass in the holes indicating poor growing conditions on that green or in areas where heavy traffic has caused the grass to thin out.

In the spring, for an ideal transition from cool-season grasses to bermuda, the disk spiker is an excellent machine to use. With triplex spikers available for riding greensmowers, spike the greens at least once per week to aid the bermudagrass sprouts coming up in the slits created. In the spring when the bermudagrass has shown a good transition is probable, the transition can be hastened by eliminating the cool-season grass gradually by vertical mowing lightly or use of brushes. As soon as the transition is made to bermudagrass and the temperatures are high enough for vigorous growth from the bermuda, then frequent light vertical mowing helps to keep the bermuda from building up the conditions described.

If there is a mixture of grasses in the green, it is advisable to remove it. If it is allowed to go through one winter's overseeding, the grass will be set throughout the green by the man changing the cups. He cannot see the foreign grasses due to the overseeding and in many instances, he does not care.

Be sure to topdress the greens with the same type of soil the greens were constructed from, especially if the greens were constructed properly and the soil media is the type that supports good growth. Usually light, frequent topdressing is better than heavy topdressing and with modern equipment, topdressing should not be the chore it used to be. Some golf courses still use the hand method, but fewer each year. Spreading topdressing and distributing it evenly on the greens after it has been placed can be done easily with modern equipment.

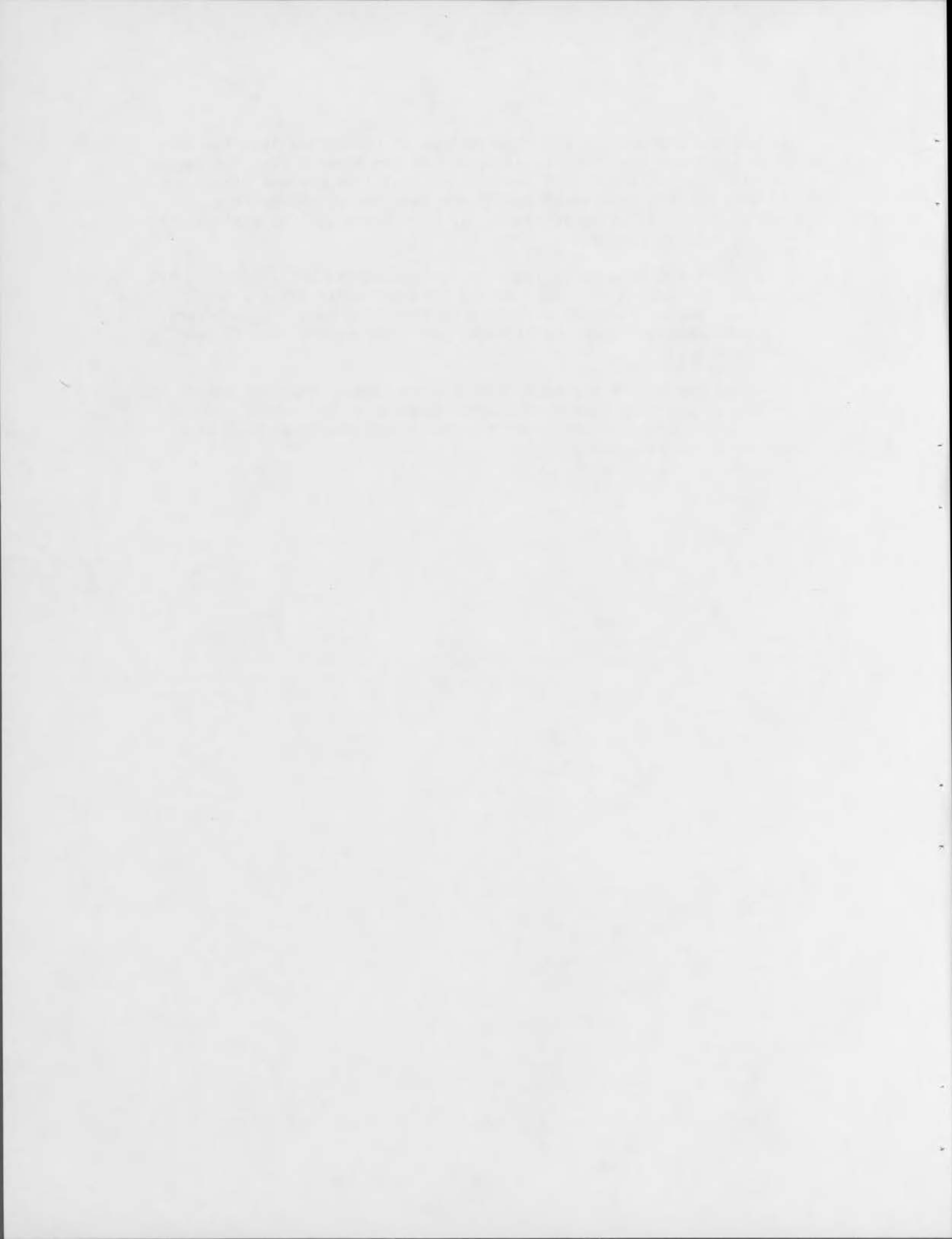
Poa annua has been a problem, but it can be minimized when chemicals are properly used. Preemergent chemicals applied prior to overseeding can be quite hazardous, but if test are made on a small area 1 or 2 years prior to applying to 18 greens, there can be excellent control of Poa annua. Poa annua seed can be included in seed used for overseeding, especially if the seed are the same size. Be sure to buy good seed, free of weeds and preferably treated with a fungicide.

Light patches of grass throughout bermudagrass greens have been observed and soil samples in these areas have shown nematodes and disease complexes that change the physiological appearance of the grass. Often these will be mistaken for a foreign grass, and we also see mixtures of grasses in greens. As was mentioned, when there is a mixture of grasses, they should be separated as soon as possible. If it becomes too thick, then the greens should be gassed and replanted at your earliest convenience. If the soil test indicates that there is a high enough population of nematodes to treat, greens can be treated now with minimum exposure of chemicals

to golfers and wild life. Interjection of nematocide into the root zone has given excellent results, and at the present time, it appears to give control for 1 to 2 years. There will be minimum disturbance to play by interjection of nematocide into the greens surface. The golfer may be affect psychologically, but there will be minimum effect on the roll of the ball.

There can be much variance in fertilization, but 1 1/2 to 2 1/2 pounds of nitrogen per 1,000 square feet per month using a 4-1-2 ratio or the equivalent, will give sufficient growth. When greens are overseeded, 1 pound of nitrogen per 1,000 square feet is usually sufficient.

The greens are the most important portion of the golf course and if you do not have good greens, your management had better improve. We have discussed a portion of the management practices that have proven to be beneficial.



YEAR ROUND MAINTENANCE OF TEXAS TEES AND FAIRWAYS

Holman M. Griffin
Director, USGA Green Section
Mid-Atlantic Region, Charlottesville, Virginia

If there were a standard recipe for maintenance of fairways and tees in Texas, I am sure someone would have come up with it long ago. I doubt that such a recipe will ever be possible because of the variables involved such as climate, budget, water, soils, and so on.

About the only thing we can assume safely is that most of you are growing warm-season turf as the base grass for fairways and tees. What kind of warm-season turf opens another "Pandora's Box?"

I suppose we could spend the rest of the time just exploring the many possible varieties of bermuda for this purpose, but we probably would not get past the first two minutes of discussion without a lot of personal preference entering in.

Without going any further, let me state a personal preference based on observation of several hundred golf courses. Plain old common bermuda is hard to beat for fairways and tees because of its ease of establishment from seed, formation of a good turf which is more easily overseeded than most hybrids, it forms a minimum of thatch and is generally more economical to maintain.

Dr. Potts told his first turf class several years ago that a well maintained common bermuda is preferable to a poorly maintained hybrid variety. That statement will probably be accurate forever just as he said it.

How you maintain your fairways and tees is determined in large measure by the standard of maintenance expected by your membership and most of all by how much they are willing to spend to get what they want. A third important factor is how wisely you use the resources your membership provides and our presence at this conference shows that we are trying to learn better ways for using the money we get for turf maintenance.

It took four years of college indoctrination to show me how and why we use all the various chemicals for plant growth and about six weeks of practical experience to find out why we don't. One of the primary reasons for not maintaining all turf in putting green quality is money or more specifically, a lack of money. When you get right down to the facts, there are few if any turf problems that money won't overcome.

Getting down to the actual maintenance practices used on fairways and tees, we should narrow our scope of interest mainly to the fairways and temporarily dismiss the subject of tee maintenance by saying that the best tees are maintained very similarly to greens. The only real differences in green and tee maintenance might be the height of cut. We change the location of tee markers on tees and cups on greens and the two should be changed frequently, usually every day, and their location should be chosen with reference to one another.

Fairways probably will not get the special care afforded greens and tees, but in my opinion, fairway turf ranks second in importance only to the putting turf. Off the tee, golfers can get the ball in play about as well from a bare spot as they can from lush turf, provided they can get the wooden tee in the ground. Poor turf and bare spots in a fairway either causes difficulty in playing a shot properly or forces the golfer to move the ball to a better location which is frowned on by the rules of golf.

Bermuda fairways should be cut a 1/2 inch or less during the growing season and allowed to grow to about 3/4 of an inch during the last few mowings in the fall if you don't plan to overseed. The additional height allows better protection through the winter months. If you overseed, cut the fairways as close as possible before overseeding and depend on the winter grass for protection.

You might cross cut fairways once in a while for the same reason you cut greens a different direction each time and you should avoid ruts in the fairways by varying the path of the tractor wheels with each mowing. This is done on each end of the fairway by alternating the mowing of these turning areas between the fairway mower and the tee or collar mower at every cutting. Even though the tee, collar and fairway mowers may be set at three different heights of cut, this is not likely to cause a problem if you mow often enough.

During good growing weather, your fairways will most likely require mowing three times a week or just about every other day to keep them in good condition. Frequency of mowing should be adjusted according to the rate at which the grass is growing.

Maintenance equipment is necessary at times on a fairway, but we should try to keep any unnecessary traffic off of any turf area. Many times it is the little details which are so often overlooked that make a great deal of difference in the standard of excellence achieved. Most of the time we blame the golfer and cart traffic for our problems when our own maintenance equipment may be doing a great deal of the damage. Also, this is just another argument for

service roads and cart paths wide enough and strong enough for use by golf carts and maintenance equipment. If you don't have adequate service roads, keep to the deep rough and especially avoid traveling across critical areas such as the fairway landing areas, if you must get on the fairways.

Well fertilized bermudagrass will quickly heal many traffic scars. On the other hand, over-fertilized bermuda tends to be more easily damaged and produces a great deal more thatch. Proper fertilization of fairways is almost as difficult to pin down as which grass to plant in the first place.

Heavy fertilization of up to 1 pound of nitrogen per 1,000 square feet per week will help to cover the fairway, but once coverage is satisfactory, we have found that about 3 pounds of nitrogen per 1,000 square feet per year or 132 pounds per acre per year will maintain both good color and density.

Most of us are familiar with the problem Sonny DuBose had at Houston Country Club when his members asked him to avoid thatching and aeration but to keep the fairways green and vigorous. His answer was to use less nitrogen and to apply the bulk of the fertilizer in organic form later in the fall. Others have tried similar programs of fall fertilization using under 3 pounds of nitrogen per 1,000 square feet for the year's total with different types of fertilizer and got excellent results.

Both practical experience and research leads us to a closer look at timing of our fertilizer applications on bermuda as well as the amounts applied. I believe I am correct in stating that the masters degree thesis by Mr. Sims A. Reeves here at Texas A&M indicated that fertilization of bermuda late in the year may cause early dormancy or top kill, but the turf fertilized in this way was the first to come out in the spring and was in better condition than turf fertilized in the normal way.

There is also much to be said for higher rates of summer fertilization and control of thatch by slicing and sweeping. This program is necessarily more expensive but provides excellent results at several clubs, especially those having the dwarf or fine leaved hybrid bermuda fairways. One club in particular uses 6 to 7 pounds of nitrogen per 1,000 square feet per year on Tifgreen fairways and thatches and sweeps twice a year. Except for a moderate infestation of spring deadspot, which could easily be aggravated by the heavy rates of chemical nitrogen, these fairways are outstanding. The chemical nitrogen may possibly encourage spring deadspot, but without a doubt, the heavier applications help to heal the scars much more rapidly in early spring.

A discussion of fairway fertilization could probably best be summarized by saying that a proper program considers budget, the special effects desired, the type of grass and the amount of traffic. Bermudagrass is certainly one of the easiest grasses to fertilize because of its tolerance for miscalculation and because it readily exhibits visible symptoms of nutrient deficiency and responds rapidly to treatment.

Whether your fairways are watered or unwatered will have an influence on the type of fertilizer you use. For unwatered fairways the new IBDU (isobutylidene diurea) fertilizers are excellent since the release of nutrients is primarily dependent on available moisture. These fertilizers are still quite expensive and probably because of this and possibly other factors, they have not made much of a dent in the sale of organic and ureaformaldehyde materials.

On watered fairways, urea is still a major source of nitrogen because it is one of the cheapest forms available. For nutrients other than nitrogen and for the lime requirement you should rely on soil tests. Fortunately, most of the minor elements required are inherent in Texas soils, especially those which have high clay and organic contents.

I don't know how much emphasis has been placed on damage from nematodes in Texas recently, but I suspect that for a number of years many of our undiagnosed turf problems were nematode-related. The northeastern states are just now becoming nematode conscious and this pest is becoming increasingly unpopular on cool season as well as warm-season turf. It would be a good idea to check all turf areas periodically for nematodes, especially those which do not seem to respond actively to fertilization.

Other pests are also a constant problem and hopefully, new pesticides will be developed as the old standbys are condemned as environmental pollutants. We have several new insecticides such as dursban and aspon and the not so new diazon and sevin, to mention a few, but the lasting residual effectiveness of the chlorinated hydrocarbons may be hard to replace. The restrictions on DDT and toxaphene caused some serious problems, especially with the care of trees on golf courses.

The EPA has also handicapped our weed control programs by restricting the use of some of our effective herbicides, but fortunately there is still a good selection of these materials on the market. One of the most popular forms of weed control in recent years is the use of non-selective chemicals such as sodium cacodylate (Phytar 560 or Rad-E-Cate 25) and paraquat to control all green vegetation on dormant bermuda fairways. The new chemical kerb has been tested in Florida and shows much promise, especially for Poa annua control.

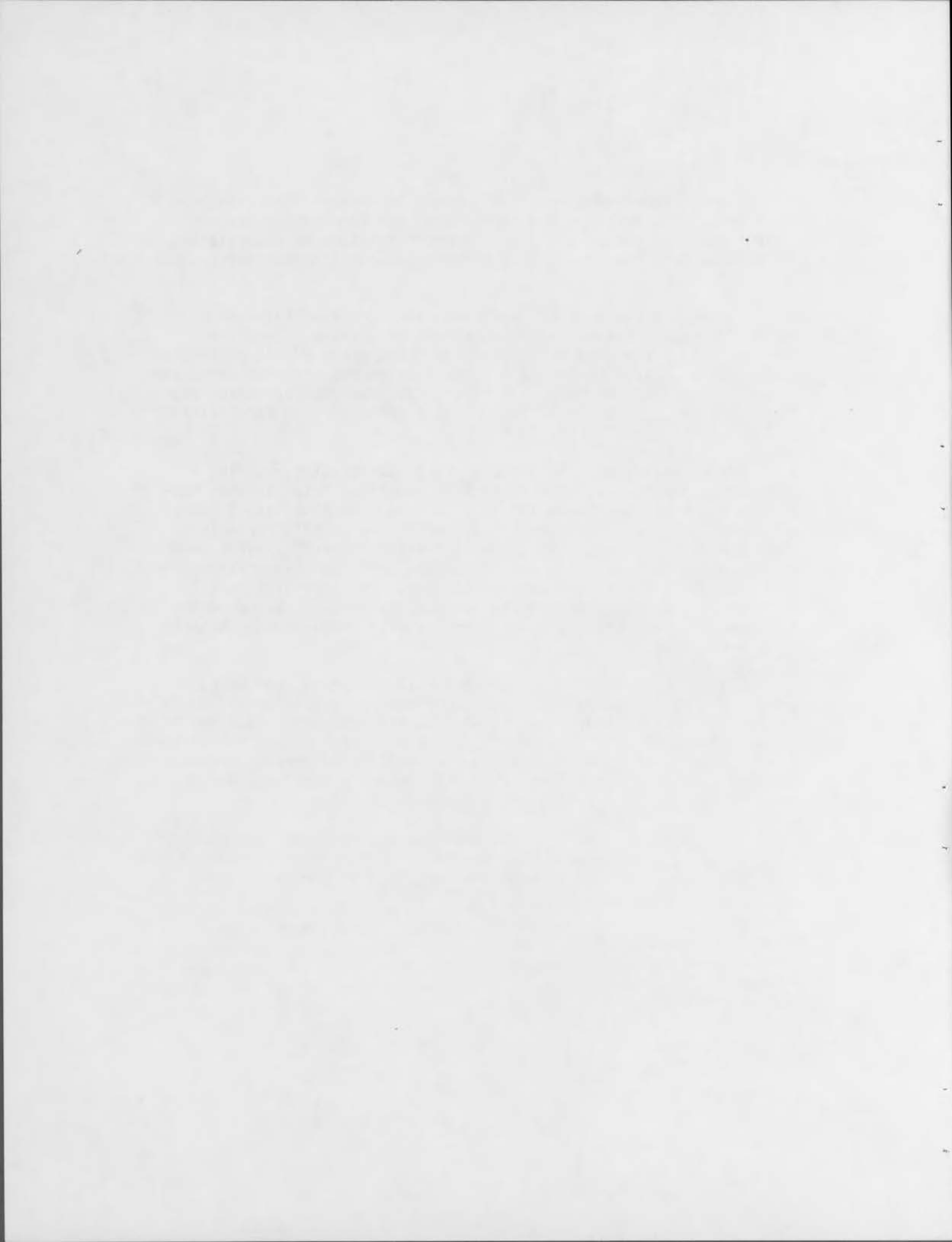
I would guess that relatively small amounts of fungicide are used on bermuda fairways but here again, the EPA has limited our selection. The restrictions on mercury fungicides in some states have taken away one of our most economical and effective materials, phenyl mercury.

Fungicides are probably most important on Texas fairways for establishing and maintaining the overseeded grasses. Some seed are now sold pretreated with fungicide which makes a vast difference in safety of establishment at a cost of approximately four cents per pound. This plus the fact that many of our new seed varieties are naturally more disease resistant helps a great deal in establishing and maintaining our winter turf.

Moving on entirely to the subject of overseeding, we find a great many improved ryegrasses such as Pennfine, Pelo, NK 100, Manhattan and PSUPT available for this purpose. We also have a number of blends of these and other grasses which are rapidly replacing overseeding with annual rye. One club with Tifdwarf fairways overseeds yearly with creeping red fescue and both the winter fairway and the spring transition are outstanding. Poa trivialis is still a favorite grass for overseeding, especially on tees, but even the best quality seed of this grass nearly always contains some troublesome weeds.

A light seeding of annual ryegrass at 150 pounds per acre, mostly for color during the winter, may cost as little as \$13.50 an acre. The fescue seeding mentioned a moment ago costs about \$40.00 an acre for seed at a rate of 100 pounds an acre. At the top of the scale, some clubs have spent as much as \$180.00 an acre on overseeding fairways, but I doubt this will become a very popular idea even though the overseeding and transition are near perfect.

The old adage that "You get what you pay for," may not always be true in turf management, but we can be certain that a good standard of maintenance is expensive and that an adequate budget is essential to a good turf.



SEEDING AND HYDROMULCHING

Pat Collins
Superintendent of Airfield
Houston Intercontinental Airport
Houston, Texas

Hydromulching, per se, is not new to Texas, nor any other state. The use of this machine has many purposes other than just planting grass seeds or grass sprigs. To name a few, this hydromulcher can be used to spray on herbicides, insecticides, water areas where water must be piped and also to plant flower seeds if needed on roadways, highways, city parks and the like.

Hydromulching is the application of seeding any given seedbed in a very fast method to correct badly eroded areas in the soil; such as, newly developed housing complexes, commercial buildings and roadways into and out of picnic or campgrounds throughout state parks, city parks and almost any place where the public as a whole will go to enjoy the out-of-doors.

To examine the whole product before it is sprayed to a given seedbed, you must first measure out what type of seed is to be planted and how many pounds per acre are to be used. Then, you must mix in a given amount of fertilizer--perhaps 350 pounds per acre--and add organic material if your specifications call for any. You then insert a good soil stabilizer to hold the seed to the seedbed in cases of heavy rainfall. This mixture is then added to water and you have a slurry to be shot from your nozzle of the hydromulching equipment.

Mulched seedings germinate quicker, provide denser stands and produce larger plants than those not mulched. However, many of the natural mulch materials, such as straw and hay, contaminate previously fumigated seedbeds. The new, specially prepared wood fiber mulches provide the beneficial effect of natural materials and also are weed free. Along the highways, median strips and slopes, mulching tends to assure good turf establishment from seed--as do flower seeds. Not all grasses are established from seed. Turfgrasses, such as bermudagrass, creeping bentgrass, carpetgrass, centipedegrass, zoysiagrass, kikuyugrass and St. Augustinegrass, are generally vegetatively propagated from shredded or chopped sprigs.

Table 1. Turf rating July 15, 1972, Intercontinental Airport, Houston, Texas.

Sprigging treatment (3 bu/1,000 sq. ft.)	Percent cover	Uniformity (1 good, 5 poor)
Hand sprigged and capped with wood cello fiber	60	2.0
Simultaneously hydraulic sprigger and mulched with wood cello fiber	53	1.5
Hand sprigged and rolled in with a disk	51	3.6

The seedbed - A firm, smooth, fine seedbed is most essential for hydraulic sprigging, just as it is for conventional vegetative establishment. Soils should be limed to give a pH of 6.5 and fertilized so soil phosphorus and potash is adequate to a depth of 4 to 6 inches. Nitrogen may be applied hydraulically with the sprigs and mulch. No more than 2 pounds of actual N per 1,000 square feet should be applied from soluble nitrogen sources. Up to 8 pounds of N per 1,000 square feet from ureaformaldehyde may be applied to the seedbed with the sprigs and mulch.

Four-inch maximum - Stolons and sprigs to be used for hydromulching or hydraulic vegetative propagation should be one year old and chopped or shredded so they are not longer than 4 inches. Longer strips or stolons will clog the hoses and pumps of the hydraulic planting equipment. Most hydraulic mulchers or those that have gear-driven type pumps are best--or only used for sprigging. In fact, it becomes a requirement. Generally, 4 bushels of sprigs mulched with 35 to 40 pounds of fiber is recommended for establishing fine turf areas such as putting greens. An additional capping of 10 to 25 pounds of mulch during hot, dry weather may be beneficial. (A bushel of sprigs is generally considered equivalent to a shredded square yard of sod.)

The technique of propagating turf by hydraulic vegetative planting will not preclude all agronomic principles. It is a development that, if properly used, will aid in obtaining better turfgrass establishment with less labor.

SPRIGGING AND SOLID SODDING

Kent Potts
Brazos Valley Nursery
Bryan, Texas

Sprigging and sodding operations can be organized into three phases. First, we should consider the grass to be used for sprigging or sodding at the source, second, the actual sprigging or sodding operation, and third, is the initial care after the grass is in place.

Sprigging

Naturally, it is important to select stock material that is weed free and true to desired variety. As of this year, Texas does this for you through its certification program. For nursery areas, greens and football fields, I would strongly suggest using certified stock. For tees, fairways and other vast areas, it might not be so important if you have reasonable assurances of purity. Normally, these areas are not sterilized and you will have to use other means to control weeds and other bermuda. I mention purity of planting material as a means of preventing problems before they occur.

Once the source of sprigs is selected, the digging and handling is important. We prefer to use stolons that have been dug with a sod cutter or commercial digger so that the old hardened runners and the plant base with possibly a few roots are included in the planting material. It is my opinion that this gives a stronger starting plant because it has more stored food for germination and offers less opportunity for desiccation than verti-cut sprigs. Immediately after the sprigs have been dug, not to exceed 30 to 60 minutes depending on the weather, they should be moistened and kept moist until planting. Also, sprigs should be aired to prevent heating.

The principle of planting is to lightly cover the sprigs so that they will germinate and begin to grow. This may be accomplished with commercial spriggers, roto-tilling, top-dressing, hydrosprigging with fiber and any other method that would allow the sprigs to be covered between 1/4 and 3/4 inches. Actually, if it were practical to maintain proper moisture, the sprigs would germinate on the surface. However, it is much easier to maintain moisture with the aid of some cover; therefore, simply applying sprigs to the surface is not recommended.

As might be assumed, the post planting maintenance is extremely important. The principle is to keep the sprigs fresh and moist until it is rooted. Normally, sand greens will require 3 to 4 light waterings daily. Other soils will vary from 1 to 3 times. Of course, the weather influences the water requirements. With heavy waterings, the nitrogen leaches quickly and must be compensated for.

Sodding

The principles of selecting a good turf apply for sodding as well as for sprigging. Also, the sod must be grown on a soil that will hold on the sod while handling.

The seed bed should be adequately loose so that the new roots can readily penetrate the soil. In most instances, a palatized system is most economical and the fastest. To harvest and lay 1" sod, approximately one man hour is required per 25 yards of sod. To handle 3" sod, this is reduced to 5 yards per hour. Care of the sod after laying is very important especially the first week. It is important to keep the root zone wet and the foliage syringed until establishment begins. This again requires multiple daily waterings depending on the soil and the weather.

I hope these remarks stimulated your thinking along this line. I will now entertain questions.

TURF PESTS AND HOW TO CONTROL THEM
INSECTS

Robert P. Carter
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The southern lawn chinchbug (Blissus insularis Barber) is a very serious pest of St. Augustinegrass (slide). In this slide you see results of a high infestation of chinchbugs in a home lawn in Brazos County. I refer to this as a failure to communicate. Early applications of insecticides before chinchbugs reached damaging numbers could have saved this lawn. Probably the biggest mistake made by me, you and the homeowner is the failure to identify the problem correctly. It is easy to identify the problem as chinchbugs in this slide, but early proper identification is the real key to success. If the problem had been identified while in its earlier stage, control would have been a lot easier and the lawn could have been saved.

Let us now discuss just what to look for in early identification of chinchbugs. The first signs will probably appear as small irregular dead patches of grass and they are often mistaken for drought or low fertility. If it is chinchbugs, the largest concentrations will be found along the margins of the dead areas. By close observation, by this I mean getting on your hands and knees, one may observe the small black adults which have white to silver wings, scurrying through the grass. If one takes the grass and opens it up, he may be able to observe some of the small red nymphs with white bands across their abdomens, or the larger black nymphs, near the base of the leaves or on the stems where they do most of their feeding. On sunny days, the adults are often seen sunning themselves on leaf tips or on exposed areas, such as sidewalks.

Another simple method of determining whether one has chinchbugs is the flotation method. It involves the use of a cylinder (slide showing can) in this case a pound coffee can. The can is worked down through the grass into the soil as to prohibit water from escaping. Water is then applied until it covers the grass surface. The chinchbugs, if present, will float to the surface within three to five minutes. It has been observed by various researchers that chinchbug damage will show up at infestations of 20 to 30 bugs per square foot.

Let us now determine how the chinchbug causes the damage to St. Augustinegrass. Chinchbugs insert a slender piercing beak called a stylet into the grass and suck the plant juices. Researchers have shown that the salivary juices of the insect and the plant materials react to form substances that block the conductive tissue of the plant. This blocking of food transport passages is probably

the principal type of plant injury. Some have suggested that the chinchbug may also be a disease vector and a means of spread for many diseases of St. Augustinegrass. The use of insecticides has proven quite successful in controlling the chinchbug. There are a number of insecticides used specifically for chinchbugs and a few of them are listed below. I would suggest following the recommendations for each one as rates may vary.

Table 1. Insecticides for controlling chinchbugs.

Aspon
Dursban
Diazinon
Trithion
Ethion

Another way we might control chinchbugs is through the development of resistant varieties of St. Augustinegrass. If some of you were here during our Field Day, you might remember the St. Augustine study I reported on. Tests are currently being carried on to determine the tolerance or resistance to chinchbugs. Plugs from each plot have been placed in the greenhouse and infested with chinchbugs under caged conditions. We hope that we can develop an improved variety that will show both insect and disease resistance.

In turning our attention to another pest of both home lawns and golf courses, we find the sodwebworm. The sodwebworm is the larvae of small whitish, or grayish, moths often called lawn moths. They are frequently seen flying over the lawn in early evening. The larvae do their damage by feeding on the grass leaves. (Slide showing damage) Here you see the result of a high infestation of sodwebworms in a St. Augustinegrass lawn. As you can see, the damage is quite severe and does not appear unlike chinchbug damage but, on close observation, you can actually see the chewed and frayed leaves. Since most of the feeding is done at night, they may go unnoticed until they reach damaging numbers. Routine investigations of greens on golf courses for early damage symptoms is advisable to combat heavy infestations. The injury is first noticed as irregular brown spots and later as ragged uneven patches of growth. As in the chinchbug, early identification is the key to success. The larvae build burrows or tunnels, which are lined with silk, close under the soil surface. Early morning investigation following a heavy dew may show appearance of the webs as sunlight is reflected.

In taking a quick look at the life cycle of the sodwebworm, we find that the adult female moths drop their eggs at random as they fly over the turf. These eggs hatch in a week to ten days. The larvae feed on the grass until they reach full growth, about 3/4" long. They are brown or gray and usually spotted. They pass the pupal stage in cells in the soil. There are several generations per year, and the winter is usually passed in the larvae stage.

Here are some of the recommended insecticides for the control of sodwebworms. Rates are not given in the table but should be the same as those recommended on the label of the insecticide.

Table 2. Insecticides for controlling Sodwebworms and Fall Armyworms.

Chlordane
Carbaryl (Sevin)
Diazinon
Dylox

Another insect quite similar to the sodwebworm and one that causes the same type of damage is the fall armyworm. They, like the webworm, feed mostly at night and consume the grass leaves. In turf areas, such as golf course greens, the damage looks just like webworm damage. They cause the grass to look ragged and bare. When heavy outbreaks occur, the larvae may devour the grass down to the ground.

The fall armyworm's life cycle is as follows: In the spring, moths lay egg masses averaging 150 eggs on the grass plants. These eggs are covered with hairs from the moths body. The eggs hatch in about a week and the larvae start to feed on the grass plants near the ground. The larvae are not generally noticed until they reach a length of 1 to 1 1/2 inches. By this time, if abundant, they are consuming so much grass they cause alarm. The full grown larvae vary in color from light tan or green to nearly black. They have three yellowish-white hair lines down their back from head to tail. Another distinguishing characteristic is the prominent yellow inverted "Y" on the front of their head. When abundant, the armyworms may completely clean an area of vegetation and then crawl in great armies to adjoining areas. Suddenly, when full-grown, all the armyworms disappear, having dug into the ground about an inch to pupate. Within two weeks a new swarm of moths emerge from the ground starting the cycle over again. The adult moth is about 1 1/2 inches across the wings; the hind wings are grayish-white and the front pair are dark gray, mottled with lighter and darker splotches and having a noticeable white spot near the extreme tip. They are active mainly at night and are not frequently noticed. Only one generation of larvae is usually abundant in any one community in the north. But, in the south, there may be 5 to 10 generations in the same locality in one year.

In control of fall armyworms, the insecticides used for control of the sodwebworm are also effective (Table 2).

One insect that has been getting a lot of attention in the Dallas-Fort Worth area because of its damage to St. Augustine lawns is the grubworm. The white grubs principally Phyllophaga spp. are the most widely distributed group of grubs that infest turf. There are over 150 species in the United States alone. The adults are the familiar May beetles or June bugs that often fly to lights on warm nights in the spring. The larvae, or grubs as they are called, live in the soil and feed on the roots or rhizomes of the grass plants. In lawns with high infestations, sod may be rolled up as a mat exposing the grubs below.

The grubs present a special problem in control. They vary somewhat in their life history; some completing their growth in one year, while others may require as much as four years. However, the three year life cycle is by far the most common. Insecticide control has been quite variable as the grubs vary their depth of location within the soil at different periods of the year.

Another pest commonly found on home lawns and golf courses is the mite. Mites are close relatives of insects, and several species suck the sap of grasses and cause a blotching or stippling of the leaves. Continued feeding may cause severe chlorosis and death of the leaf. In severe infestations, brown and dead stolons are common and entire plants may be killed.

The bermudagrass mite is the one of the most common causes of damage in turf areas. These eight-legged creamy white mites are extremely small, being only 1/100 of an inch in length. They cause the plant to grow abnormally with shortened internodes and rosetted or tufted growth, and heavily infested plants turn brown and die. The mites usually favor hot and dry weather. Two species commonly used in turf areas, Floraturf (No-mow) and Tifdwarf, are extremely susceptible to bermudagrass mite damage. Some insecticides used for bermudagrass mite control is shown in Table 3.

Table 3. Insecticides for controlling bermudagrass mites.

Diazinon
Ethion
Trithion

In closing, I would like to quote one of my professors here at Texas A&M when he said, "An ounce of prevention is worth a pound of control." By prevention, it means being able to recognize early infestation symptoms and knowing what insecticides or management techniques are needed to solve the problem before it becomes too serious.

RELATIVE VALUE OF NATURAL ORGANIC, SYNTHETIC
ORGANIC AND INORGANIC FERTILIZERS

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Value, according to Webster, has several definitions - "the monetary worth of something: marketable price" or "relative worth, utility, or importance: degree of excellence". This presentation will deal with the degree of excellence imparted by nutrient sources to turfgrass management. While defining terms, the American Association of Fertilizer Control Officials definitions will apply: "The term Organic when applied to the source of a fertilizer component shall include only organic materials that are insoluble in water".

To further qualify statements, we realize that a plant root, as far as we know now, absorbs nutrients as ions dissolved in the soil solution. The differences among nutrient sources are meaningful only relating to ease of application, nutrient content, speed of availability and other factors that are of importance to the plant, the soil or the applicator.

While in school, we were taught to grow commodity crops, to produce the most quantity the cheapest way. Turf, however, does not fall into this category (except maybe for sod production). We are interested in the quality of residue after the crop is harvested. Such an understanding changes the approach to turfgrass fertilization and cost per nutrient unit is not as important as the way it is used to produce an end product of usable, healthy, pleasing turf.

Since nitrogen is the primary growth nutrient let us consider some of the sources and their advantages and disadvantages.

Inorganics (Solubles): These are illustrated by ammonium sulfate, ammonium nitrate, nitrate of soda and urea. The last is technically an organic but its solubility, rapid availability and burn potential cause its inclusion with this group. These materials are quite soluble and hence readily available for plant use. They have low residual properties so should be applied lightly and frequently to promote uniform growth and color. Because of the rather high salt index, most applications are light, applied to dry grass and irrigated thoroughly as soon as possible. They are frequently used in a combination with slow release organics to show an immediate color/growth change until the organic's breakdown begins.

Ammonium sulfate is one of the most popular solubles, since its sulfur content often contributes to added greenness. This is especially true where "modern" mixtures are used. These mixtures are made up of more purified N-P-K sources and do not contain such beneficial "contaminants" as sulfur.

Natural Organics: These materials have been used in agriculture almost since it began. Night soil, manure, fish scraps and guano are among the oldest of the group. Later, sewage sludges, dried blood, seed meals, tankage and similar materials came into use as they became available.

In general these products have a rather low nitrogen content and, as a result, are rather bulky. Bulk, however, is an aid in uniform application, so this is not necessarily a drawback. They are difficult to overapply. These N sources are used alone or in mixed goods with a 20% total N-P-K guarantee, such as 10-5-5.

Sewage sludges also contribute phosphorus and minor elements, due to the variation in sewage plant influent sources. Only 3 cities produce activated sludge for fertilizer use: Houston, Chicago and Milwaukee. The latter is the only one from which most of the production is sold as an identified product. Other sludge products are digested prior to drying and have a nitrogen content of 2-3%, instead of the 5-6% for activated sludges.

Seed meals and some of the tankage products seldom find their way into the fertilizer market since they are more valuable (\$) as an animal feed material. Leather tankage is still available in some areas. Castor pomace produces good turf growth, but is highly irritating to people sensitive to ricin and is not used extensively.

The breakdown of natural organics and consequent availability of nitrogen and other nutrients to plants is dependent upon soil microorganisms. This process is rather slow and because of it there is a lag between application and plant response. Moisture and temperature are primary factors in this release pattern since they have an effect on activity of the organisms. Particle size also has an effect and will be discussed later.

Synthetic Organics: Other than urea, this group is illustrated by products such as ureaformaldehydes and isobutyldiene diurea. Both are products of urea condensation, the former with formaldehyde, the latter with isobutyl aldehyde. Breakdown of these materials is practically a reverse of synthesis, except that UF materials depend on microorganisms to a large extent while IBDU does not. Temperature seems to have less effect on IBDU than UF. Soil pH has a drastic effect on IBDU conversion and to a less extent on UF. Maximum release is seen in acid soils.

While both materials are used singly, their major application is in high analysis mixed materials which contain soluble N sources.

Regardless of the organic nitrogen source, particle size plays a direct role in N release. The finer the particle, the more rapid is N conversion to a soluble form. For this reason a great deal of study is given to particle size distribution to provide steady N release over a given period of time.

Coated Materials: Plastic coated soluble sources are again on the market. These depend on osmotic action moving nutrients through a plastic shell slowly. Sulfur coated urea is also being closely studied at this time. The latter seems to perform well on higher cut grasses, but gives a spotty effect on putting green turf.

Other nutrients: Phosphorus sources have dwindled until 43% P_2O_5 is the only readily available source. The old 20% material, even though the S is important is very hard to find anymore. Originally bone meal was a major source, but it is now limited to small packages in garden stores.

The ready availability of sulfate of potash now is certainly encouraging. It has direct advantages over muriate by supplying sulfur as well as being much less likely to burn the turf. Its low solubility makes it difficult to spray, but it still is the preferred K source. Tobacco stems and greensand are other "natural" K sources, but are largely regional in market availability and are of little consequence in much of the U. S.

There is no doubt that any of these materials will grow grass. Today's turf manager must, however, be cognizant of the straight materials he uses as well as the components of mixed goods. He must be knowledgeable of minor element presence and absence, especially in mixed materials, since toxicities are often more destructive than deficiencies.

Using this knowledge, he can plan a sensible fertilization program for high quality turf. And quality is the only commodity we have to sell.



PRE-EMERGENCE WEED CONTROL IN TURF

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When anyone shows up at your course with an answer to all your weed problems, BEWARE! A considerable amount of study is necessary to even be familiar with the name of the chemicals currently on the market let alone how to use them. Focusing our attention on pre-emergence chemicals alone, we find a vast array of products which are somewhat bewildering. If you really want to know how confused we are about pre-emergence weed control, I suggest you refer to the December 1967 issue of "Ground Maintenance" magazine and examine the recommendations from across the country for crabgrass control. Since 1967 the recommendations may have changed slightly but the confusion for the consumer and the difference of opinion among experts still exists.

I have personally encountered two instances within the last year or so where representatives of a well known company were selling chemicals for Poa annua control in bent greens. Both superintendents needed help with their Poa annua problem desperately and trusted the representative who in both cases was rather vague with technical information but promised outstanding results with their chemical as well as appropriate gifts to the superintendent for doing business with him.

Each course received a 55 gallon drum with a very technical label of ingredients and directions for use. In both cases the material was the same and contained as the main ingredient, 2-4 dichlorophenoxyacetic acid which most of us recognize as 2,4-D. The chemical 2,4-D does give some pre-emergence control for many plants but the problem is, it gives post emergence control of bent grass and would have wiped out the greens for the season.

There is a mountain of data on pre-emergence weed control, but all of it is insufficient to give us the sure fire practical information we need for effective use. Results are highly variable and in many cases the chemicals cause more problems than they solve.

As of right now, no one is certain of the optimum time of application, residual, effectiveness, safety or proper use of any of the pre-emergent chemicals.

Lets make a list and examine the most commonly used chemicals one by one.

Terbutol (Azak) - a carbamate herbicide, is in somewhat limited use because of margin of safety to turf, especially cool season species. Control of crabgrass and goosegrass is good but very little is known about the physiological and biochemical action of this material. It restricts root and rhizome growth and can cause delayed long term injury. Absorption of the chemical is through the root of the plant and damage occurs after the chemical is absorbed rather than as a direct foliage burn. Bermuda varieties seem reasonably tolerant to this chemical and it may prove quite good for this purpose.

Bensulide (Presan and Betasan) - has a long residual life and was test marketed in 1964. Pre-emergence control with this material ranges from excellent to poor and timing of the application or applications seems to be very important. Research results and field applications seem to indicate a reduction in root growth when the material is used and sometimes damage to the stand of turf with repeated use. This is a most useful material, but it would help to know a great deal more about its proper use. If properly applied, bensulide will prevent the establishment of almost any seed during the residual life.

Benefin (Balan) - is a trifluralin derivative which has proven effectiveness for control of crabgrass, Poa annua and goosegrass with a wide margin of safety to certain turf species. Benefin will injure bent, but appears relatively safe on bluegrass, zoysia and common bermuda in fairways. Injury from benefin has been noted on Tifdwarf and Tifgreen bermuda. Residual is about three months or longer depending on many variables. This chemical should not be applied in the spring following a fall seeding.

Bandane (a chlorinated hydrocarbon) - is actually an insecticide which is similar to chlordane. It has good residual and controls ants, grubs and Japanese beetles. Mode of action in preventing crabgrass and goosegrass is unknown but test results are favorable as to safety and effectiveness although Tennessee reported some phytotoxicity on bent greens. The main objection to this material is cost, which is in the area of \$60 per acre. It has found some favor in the Washington D.C. area for the past two years for use on bentgrass and as yet there have been no reports of injury.

Chlordane - this chemical is used very little anymore as a pre-emergent (because of danger of long term damage) which shows up several months after application and may last for years, appearing when the turf is under stress. This is a good insecticide

which is safe on turf at the recommended insecticidal rate. It has been used on bent greens as a pre-emergence in Tennessee in several instances for as long as 10 years without any ill effects directly attributed to it which adds to the confusion.

Tri-calcium arsenate - an arsenical product gives some control of insects as well as pre-emergence control of Poa annua, crabgrass and chickweed. Residual may last up to five years. This chemical also acts as a post emergence control in some cases, especially on Poa annua. The mode of action is through absorption in the plant replacing phosphorus.

One course has made applications for the past three years to bermuda and bent greens with no complications to permanent turf or overseeding establishment at the rates we recommended. Good weed control has been achieved.

When using a tri-calcium arsenate program, light frequent applications at certain times of year to coincide with the growing season of the turf and the planned overseeding dates are suggested. Fertilizer applications should omit phosphorus and light applications of phosphorus may be made to counteract injury which may occur on permanent turf. Control rates are variable depending on phosphorus content of the soil.

DCPA (Dacthal) - is in the group known as phthalic acids or terephthalic acids which are quite different in mode of action, but chemically related to dicamba (Banvel-D). Dacthal is neither absorbed by the foliage nor translocated in the plant and is effective only when applied before germination.

The material was most effective and had a high degree of safety for several years. About four years ago, some changes were made in dacthal which gave it greater solubility, and since that time we have had some reports that this chemical did not seem to perform as well as the older material which some superintendents still had in storage. Dacthal does interfere with the pegging down of bermuda but then so do all pre-emergents to one degree or another. This chemical is not recommended for Cohansey bent or fine fescue.

Siduron (Tupersan) - is a substituted urea in the amide group. Tupersan interferes with the photosynthetic processes in certain weeds and is a good pre-emergent with a high degree of safety to most bent grasses except C 1 and C 19, Washington, and some of the grasses which appear as a result of segregation of Seaside. Tupersan is particularly damaging to bermuda and is now being used to selectively take bermuda out of bent greens. Tupersan may be applied before, during or after seeding with good results.

PMA (Phenyl mercury) - has some action in preventing crabgrass in that it burns the young, tender plants. It may possibly have some pre-emergent qualities which have yet to be discovered, but it is a proven fungicide and has some anti-transpirant action on turf which helps reduce water loss during stress periods. PMA must be used properly to avoid burning of the permanent turf

Some other pre-emergence materials worth mentioning are simazine, atrazine, diphenamid (Enide), zytron (DMPA) and kerb.

Simazine and atrazine - are both post and pre-emergent materials and have been used in the Carolinas and in Tennessee for some years. They are effective and inexpensive but without much of a safety factor on any turf.

Diphenamid - is experimental and information on it is limited.

Zytron (DMPA) - has been taken off the market and used only for testing for two or three years.

Kerb - is an experimental post and pre-emergence chemical which has shown excellent promise in Florida tests.

Now for some general observations about all the pre-emergence materials.

Timing is critical but there is little conclusive information on the optimum dates of application. For most of the materials mentioned, between March 15 and April 15 seem to be good dates, with March 15 to April 1 being best. This applies over a large portion of the United States. Natural indicators may also be watched and applications timed to coincide with the fading of the forsythia flower and when lilacs and dogwoods first begin to bloom. The exceptions are tri-calcium arsenate, phenyl mercury, simazine and atrazine.

To be effective for goosegrass, applications have to be made before common crabgrass germinates, with the previously mentioned exceptions.

Soil must be left undisturbed by any cultivation which brings up soil from below and should be left undisturbed altogether if possible. Even though residuals in many cases may not last more than 45 days according to the labels on materials, and recent research information, season-long control may be achieved with a single, well-timed application if the soil is left undisturbed. Split applications at half rates may be helpful. Exceptions are tri-calcium arsenate and PMA.

Actually, these general statements should be qualified with many special exceptions because it is essential to have a thorough knowledge of each individual material to use it safely and with the greatest effectiveness. Quite often it is possible to improve upon the recommendations of the manufacturer, but always remember that in doing so you void any warranty, either expressed or implied, and whatever the result, you are the sole owner.

Manufacturer's have put a great deal of time and money into the recommendations for a product and into labeling it for turf use but even so, they can't cover every eventuality any more than they can print every use and precaution on a label. In every case, you should try the material on a limited basis before covering the course with it. If you have the facilities and the time you will be able to determine how you can best use the material on your course. If not, you will at least learn that the material does or does not do what you require at the manufacturer's rates. No matter how good it sounds, nothing is ever without some disadvantages and it is helpful to know exactly what disadvantages you may encounter before going overboard with any material.

Many of these materials such as benefin, simazine, atrazine and terbutol may damage an overseeding and such materials as bensulide, bandane, tri-calcium arsenate, and DCPA may prevent its proper establishment.

The foregoing observations are simply made in an effort to help us all better understand the pre-emergence materials and should provide a little food for thought. These observations certainly are not intended as recommendations for or against any of the products mentioned.

Finally, weed control chemicals should not be used as a substitute for good cultural practices because a strong healthy turf is still the best weed control possible.



ACTIVATORS, CONDITIONERS OR AMENDMENTS

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This presentation is on "fertilizers" that do not directly increase the amount of plant available nutrients in soil. These low-nutrient materials are supposed to work from the action of new microorganisms added to the soil or by activation of the native ones into promoting desirable soil and turf characteristics. It is well known that soil microorganisms are important in nutrient recycling and that they can affect soil physical conditions.

Should one expect a soil activator to enhance desirable soil and turf characteristics (i.e. enhance dark green turf color, reduce thatch accumulation, increase water infiltration rate, increase moisture holding capacity, increase soil aeration, reduce salt accumulation, etc.)? Before answering this question, a few facts should be recalled. Soils contain tens of millions of bacteria (even sandy soils) and tens of thousands of fungi per teaspoonful of soil. There is about 2 tons of viable microbial tissue per acre foot of soil. To increase the activity of this vast amount of tissue a large amount of energy material must be available. Unfortunately, there are not any known materials that will furnish substantial energy when added to turf at a few pounds per acre. Soil under turf already contains tons of soluble energy materials.

From the discussion in the previous paragraph, it seems highly unlikely that a soil activator would be able to activate soil microorganisms. Perhaps they can furnish new organisms to the soil that will increase soil microbial activity. The microbes in the soil are well adapted and have been selected to their environment over many years. They are not likely to be displaced easily. Perhaps a massive inoculum could establish a new organism in the soil. Unfortunately, all of the activators I am familiar with supply only a fraction of a pound of microorganisms for each acre when used at recommended rates.

Soil activators have been on the commercial market at least since the beginning of this century. To my knowledge, there is no published evidence, by scientists of unbiased organizations, that soil activators are beneficial to the soil in any way. In fact, there is much evidence attesting that soil activators do not affect crop growth or increase microbial activity in soil.

Supernate and Medina, two soil activators, have been tested extensively throughout Texas and were not found to increase crop yield. Production of bermudagrass on the infertile sandy soils of East Texas was not increased nor was cotton or grain sorghum production increased on the fertile blackland soils.

Field tests using soil activators on turf has been done using the turf plots of Texas A&M Univeristy. Mr. Wallace Menn and I cooperated in these tests. The results from using BioAct, Energizer, Soil Life, Super-Bio, Turfzyme, Medina, and Supernate did not affect turf growth or color. Nitrogen fertilizer did increase turf growth and deepended the green color of the turf.

Soil microorganisms were not activated by the use of Medina or Supernate in laboratory incubation studies. Soils inoculated with these activators contained similar populations of microorganisms to those to which only water had been added. The amount of CO₂ evolved was not increased by the activators which indicates microbial activity was not affected. Nor was the level of nitrate in the soil increased by the activators.

It seems reasonable that before an individual or organization purchases soil activators to enhance the beauty of their turf, they investigate the product by requesting factual information from unbiased organizations. There are inumberable testimonials attesting to the validity of soil activators. However, to the best of my knowledge, there is no University research that has disclosed any value from using such materials.

THE HOPE OF TOMORROW

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During these past two days I have witnessed what I feel was a very successful turfgrass conference. Being in and out of classes, I did not get to make all of it, but what I did see was outstanding. But this conference did not just happen by itself. It took the hard work of many of you people here tonight to make it a success. If you are like I am, after a great conference like this you will go back to your job tomorrow with renewed faith and enthusiasm because of what you have learned, the people you have met, and the old friends you have seen again.

I am sure that some of you must wonder what this conference, the turf industry, our country, and our world will be like 20 or 30 years from now. I know I do. This is something we are all concerned about and should be. This will be determined by the youth, the hope of tomorrow.

When I sat down to write this speech on a Sunday afternoon, I had just finished watching an NFL football game. My mind being still more on the game than this speech, I suddenly drew an analogy between a football game and my speech topic.

Let us imagine that all of us in this room are an offensive football team. You, the generation ahead of us, are the offensive line and quarterback. We, the youth, are the running backs. You start the ball into play when the center snaps the ball to the quarterback. You hand the ball, which is opportunity, off to us. You, the offensive line, block for us and try your best to defend us from the defensive team, who represents those obstacles in life which we will encounter and will try to detain us from obtaining success, which is the goal line. No matter how well you block for us, if we, the running backs, are not properly trained, we will not get very far, and vice-versa. If we are properly trained, and you do not assist us, it is to no avail for we will be dropped for a loss every time. In other words, youth and adults must work together if we are to get anywhere. Also, to work together we must be able to communicate and to understand each other. It is just like the running back not listening to the quarterback's signals. If we, the youth, do not listen to the advice of you, the experienced adults, it will end up as a busted play and we can do nothing but lose ground.

It does not matter how good a team is for it cannot go through a game without being stopped by the opposition and there is nothing wrong with being stopped from time to time. It is not realistic to go through life without meeting some obstacles. It takes a man to be able to pick himself off the ground after a hard blow and start all over again with more determination than before to make it to that goal.

On every team there are going to be some that excel above others and stand out. He will be that one who is constantly picking up the most yardage for the team. What do you do with this type of person? You reward him so he will continue to work as hard or harder than he did in the past.

The same holds true in life. You will always have some who excel above the average. Why? Because they are the ones who have taken their God-given talents and put them to use. They are the ones who work the hardest and keep the drive alive when the going gets tough. As in a game, you reward this person so he will continue to strive towards excellence. Your association does much to reward those deserving youth who have shown they desire to be better than average. By doing so, you instill within that person a desire to do his best because he knows people recognize his efforts. Each year when you hand out several awards and scholarships at this banquet, you show you have faith in us youth and I feel you should be highly commended for this. The least we can do in return is give you our best.

We American youth are the luckiest young people in this world. Many organizations such as the Texas Turfgrass Association are concerned about us and our future. We are handed that ball of golden opportunity, something not all youth in the world are blessed with. All we have to do is take that ball and do our best while we have it, but some youth are not content to do this. They do not realize what they have in their hands and fumble it away. These are the type of youth that are seen in streets carrying their signs of protest. They have no direction in life and no apparent goal or purpose to achieve during their stay here on earth. They criticize your generation for all that is wrong with America and do not realize that if it were not for the perseverance and dedication you have, they would no longer have the freedom to be in those streets or carrying those signs.

I guess it is easy to live the type of life that some of these youth live--having no responsibility, not caring about anything, living from day to day like a weed among a good crop, a weed that has built a resistance to any type of control. I thank God that there are enough healthy young plants left to still outnumber the weeds and produce a good yield.

I truly feel that many of our problems in America could be solved in the home. If a parent does not teach a child respect for others and other's property, decency, and other such qualities, institutions will not be able to either, without having a difficult time. I feel much can be learned from parents and I feel mine are the two greatest people in the world. You, as parents, have a great role to play in raising your children to become part of the hope of tomorrow.

A person eventually leaves home and either goes to a university or begins work. I guess Aggie pride cannot help but to show through, but I know this University is certainly made of people who are concerned about tomorrow and I am sure that almost every A&M graduate will certainly be part of the solution and not part of the problem.

I would like to close with this story which concerns a family living in a small wheat farming community in the Midwest. This particular family had one small daughter. One evening when the mother called the little girl for supper, she was not there. She called again and again, and after fifteen minutes the mother became frantic. The little girl's parents searched all that night and for three more days, yet nothing was found. Finally all the people of the community got together and joined hands, making a long line across the wheat field. After searching several wheat fields in this manner, they found the little girl--dead. "Oh my God," cried the mother, "if we would have only joined hands sooner."

Yes, we have gone to the moon and explored the ocean depths, but when we learn to join hands and walk upon this earth like men, all our tomorrows will be bright and beautiful.