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Sound Systems for Educational Theatres

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0 Introduction

Jack Shearing, the owner of Masque Sound in New York, has a great way of summing up the fundamental difference between professional theatre and educational theatre: professional theatre throws money at problems to make them go away. Educational theatre throws time.

While such a bold statement is at first startling, one is hard pressed to find much disagreement amongst those who have a good deal of experience in both worlds. This simple difference will be shown to have a great many implications for those that endeavor to educate students for the professional theatre, for the types of theatres used to accomplish that education, and for the consultants, engineers, and designers that are charged with the responsibility of creating these facilities.

This paper will examine those implications in detail. Part 1 will examine the fundamental differences between the professional theatres and the educational theatres. Part 2 studies the techniques typically used to prepare students to enter the various audio disciplines of the professional theatre. Finally, Part 3 looks at the roles of the consultant, engineer and designer in creating sound systems for these theatres. General and specific guidelines will be suggested, and some controversies in sound system design for educational theatres will be discusse (Hopefully, this paper will provide some necessary armaments for the building of both theatres and practitioners that are capable of extending the

boundaries of human expression in a fiscally sound manner.).

1 The Differences Between Professional and Educational Theatres

The primary function of many professional theatres is to return a profit on an investment to an investor. To attract investors, the potential for profit must be high, as well as the likelihood that the production will return a profit. To keep the profit potential high, the producer must keep a careful watch over the expenses of the production. If the expense is likely to increase the profitability of the production, it is justifiable. Since every part of the production is bought, rented or salaried, no part of the production escapes this rule.

Another type of professional theatre is the not-for-profit theatre such as the LORT (League of Regional Theatres). The primary function of this type of theatre is to provide a service to the community. This theatre also must justify all expenses, but only on a break-even basis. This allows considerably more latitude than the profit oriented theatre, but still emphasizes fiscal responsibility in all decisions. These theatres may have the best of both the professional setting (e.g. paid professionals vs. students) and the educational setting (e.g. the lack of need for return on the investment).

The primary objectives of the educational theatre are to a.) prepare students to enter professional careers, b.) to provide a service to the community, and c.) to provide a setting for artistic expression and research free of political and economic pressures. These three objectives are of necessity in conflict with each other. Indeed, it is this conflict that is the cause of many of the headaches of the sound system consultant that will be discussed in the final part of this paper. However, the fundamental assumption of this paper is that the primary objective of the educational theatre is the training of its students. In as much as the philosophy of the educational institution is consistent with this assumption, the consultant find useful information detailed herein.

These differences in the objectives of professional and educational theatres provide some rather different approaches to problem solving. While the professional theatre typically *only* looks at the financial implications of a problem, the educational theatre typically only looks at financial implications *in a crisis.*

Given the plethora of students willing to freely give their time to a production, oftentimes problems can be solved by working longer hours or adding personnel. Professionally either of these olutions involves additional expense and must, therefore, be justified. In an educational institution, since there is usually no *perceived* additional expense, the commitment of additional time to solving a problem rerely requires justification. This problem seems to be better reconciled in the regional theatres where the artistic and the financial get a more equal voice in a production.

This difference between professional and educational theatre also creates very different ground rules for the acquisition of sound equipment for a theatrical production.

Generally a professional theatre must acquire its sound equipment on the basis of its needs for a particular production. It is often not financially feasible to get the best equipment because of the need to amortize the equipment cost over the life of the show. In the case of rental equipment, the rental house must be assured that an expensive piece of equipment will be specified for enough shows to amortize its cost over the depreciation term. This is still not usually financially feasible due to the speculative nature of the investment.[1]

On the other hand, an educational institution generally does not procure equipment on the basis of the needs of any single production, (but to sere a wide range of productions that may occur at the institution). The educational, research and service objectives of the educational institution all create an atmosphere that allows consultants to argue convincingly that the state of the art equipment that will satisfy the institution's present and future needs. It is not uncommon for a student to enter the "real world" only to find that the equipment there is no match for that of the "alma mater."

Sometimes, however, the reverse of this problem is also true. Most Professional equipment is depreciated either over five to seven years (although it may remain in service longer) or the life of the show. Equipment may not be "state of the art" but it is likely to keep pace with current technologies. The capital acquisition structure of the educational institution is such that the consultant must design a sound system with a life expectancy of at least fifteen

years. It may be even longer before it is the "sound system's" turn again. This typically means that the educational institution will have an obsolete training tool for at least half that time (e.g. every other 5-10 years).[2]

The differences in basic functions, problem solving and sound equipment acquisition procedures between professional and educational theatres tend to create very muddy educational waters for students. The next part of this paper describes the more common approaches to clearing those waters that are being utilized by those educational institutions in this country that have made a commitment to educating the theatre sound student.

2 Training in Educational Theatre

2.1 Preparation for the Professional World

To train a student to work professionally requires one to pause for a moment to ponder the meaning of the word "professional." This has been a tough question for theatre sound designers especially when the word describes the professional as an artist. In its simplest form a professional is characterized by the ability to survive in a hostile world. However, in suggesting educational objectives for the budding theatre professional we must strive for a more noble description. A professional doesn't merely survive, but has the knowledge, insight and drive to compete and aspire to be the best. The knowledge is based on a very well defined engineering discipline over which is laid a somewhat less defined artistic discipline. The insight comes from experience in the field, and the drive is primarily responsible for the professional's survival. It is on this definition of "professional" that the educational objectives will be focused.

College, it is often said, is the link between the womb and the real world. College provides a wide range of experiences designed to expand and enhance students' world-views and prepare them for entrance into the adult world. It is during this period that students are given opportunities to experiment with real world situations, to fail, to learn from those failures, and eventually to learn to succeed. It is also a time of self discovery, where students mature and find a place for themselves in the universe.

Most often the student's place is not in the theatre, and even more often it is not in

theatre sound. Undergraduate theatre curricula "weed out" a great number of students from the professional theatre. Graduate school further narrows the field. Educational institutions offering programs to prepare students to enter the professional world encourage this process of natural selection. The good school tries to discourage the weak student. Programs are designed so that those who leave theatre can take their theatre training and implement it in other careers. A student who completes a graduate program in a good school is usually deserving of a chance in professional theatre.

The most common technique used to both prepare and select students is to attempt to minimize the differences between educational and professional theatre. To achieve this, the educational structure is designed to emulate the practises of professional theatre, primarily by mounting productions. Practical experience is balanced with a more theoretical education in a classroom setting. This balance is precarious because of the difficulty of providing a realistic atmosphere of professional competition tempered with the proper sense of nourishment and tolerance. Nevertheless, the first objective of the educational theatre is to minimize the differences between itself and the professional theatre.

Minimizing these differences is complicated by the need to provide students with ample opportunities to follow their own career paths: Sound Score Designer, Sound Reinforcement Designer, Composer, Sound Systems Engineer, Theatre Consultant, and Theatre Sound Equipment Designer and/or Manufacturer, etc. At the present time, very few of those students graduating with expertise in theatre sound actually pursue careers in that milieu. Typically they are attracted by the Advertising, Broadcasting and Film Industries where jobs, salaries, and working conditions are generally much more enticing. An interdisciplinary approach to the student's education which reflects this reality must be strongly recommended. This has direct implications for the consultant's role which will be discussed in Part 3.

The types of professional theatres that exist in this country also present a diverse range of professional practises. For example, Broadway and touring shows utilize a theatre that is typically defined as "four bare walls," whereas the Regional theatres are more likely to have a fixed installation that may be

augmented by additional sound equipment. The second educational objective, then, is to develop a diverse program that allows students opportunities to follow their own interests.

2.2 The Teaching Strategies of Theatre Sound Education

Teaching strategies will be developed around two objectives: minimize the differences between educational and professional settings, and develop a diverse program that allows students to follow their own inclinations.

2.2.1 Strategies for Providing Experience.

It should be quite clear that the success of the college graduate in the professional world will depend (particularly in the early stages) on a strong fundamental understanding of types and usage of audio equipment. This understanding cannot come from theory alone. It must be complemented with hands-on experience.[3] It simply does not do much good to teach students the fundamentals of digital technology if they never encounter a piece of digital equipment. The types of systems that consultants specify for the educational institution will play a large role in the educational process.

What the college needs, then, is a series of audio systems that can expand with the student's growing capabilities. The student is first exposed to the design and execution of fundamental building blocks of audio in theatrical productions. Later, when these fundamentals have been thoroughly mastered, the complexity of the systems increase to match new design challenges.

It should be evident that these opportunities cannot be offered through the use of the educational institution's facilities alone. There are many ways schools use to augment their own production programs. Many professional programs require some sort of internship experience for their students. Students must also be encouraged to work with community theatres in pseudo-professional settings that are typically much less than ideal. Another source for additional experience is provided by the need for sound mixers/engineers for local music groups. Most educational institutions bring in national touring acts, and usually these acts require additional stage hands that can be recruited from the same group of students. Finally, professional education programs usually require that their faculty remain professionally

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active. Students gain additional exposure/contacts with the professional world by working as assistants to the faculty. Consultants should take these possibilities into account when planning the facilities for an institution because they help dictate the scope of the programs the institutions are capable of offering.

2.2.2 Strategies for the emulation of documentation and design processes.

It is important to train students to emulate the documentation involved in the sound design process. Unfortunately, neither design process nor documentation has been standardized. No two designers approach a show in exactly the same way. In one instance the documentation is entirely verbal, whereas in another it must be provided in written form as a requirement of the designer's contract. However, there are some elements of the professional's design process that seem to be universal, regardless of whether the process is documented in written form. Educationally, of course, it is usually better to document these processes in written form (to make sure that they occur!).

The accompanying figures provide some examples of written documentation for a production. Although they should not be considered standard, they will give the consultant some idea of the educational (and professional) processes involved in the mounting of a typical live theatre production. Figure 1 is simply a design statement culled from the research and planning undergone in the early stages of a production. Figure 2 presents the architectonic structure of the play in a dynamics/time graph. Figure 3 depicts a standard production calendar; Figure 4 shows a portion of a typical Preliminary Sound Cue Sheet. Figure 5 is a color chart that describes on which cue each musician plays and what he/she plays. This is similar to Figure 6 which indicates which cue each deck plays and what the sound is called. Figure 7 shows a mike and speaker plot laid over a set drawing for a band platform, and a block diagram of this simple stage sound system. Finally, Figure 8 is an actual Cue Sheet that was written for a sound board operator to run the production.

2.2.3 Strategies for providing engineering and technical education.

As discussed in section 2.1, there is a relatively clearly defined engineering discipline for the theatre sound professional. The problem arises for the educator, however, in limiting the education in that discipline to those elements which are necessary to build a solid foundation for the student. Since the amount of time available to provide this type of training is minimal, it is important for the consultant to work to provide facilities which encourage the integration of this type of training into the student's experiences.

One way to limit the instruction in equipment maintenance is to confine topics to all aspects of theatre sound external to the individual pieces of equipment. The theatre sound professional is typically expected to be able to trouble-shoot problems that different pieces of equipment may have working with each other. However, it is not generally expected that this person will have to trouble-shoot problems within a piece of equipment (e.g. circuit boards). Indeed, professional practise seems to lean more to concepts of redundancy, board replacement, and service contracts as equipment becomes more and more sophisticated. It is therefore appropriate for educational training practises to emulate this trend.

At the same time there is a need to counteract a trend in theatre to separate blue-collar and white-collar jobs. One of the things that makes a good designer is that the designer knows how a particular job can be done. The designer can communicate this to the stage crews. However, if the designer does not have a firm grasp on *how* the equipment works there is little chance that the intent can be communicated properly. Stage crews know this and are not above testing the designer to find out how much is known. So although it is not necessary for the theatre sound professional to be able to go into a box and repair it, it is important that how the box works is understood. Once again a range of experiences is required that will provide a solid foundation for troubleshooting, maintaining and repairing systems outside individual pieces of equipment, and for understanding the inner workings of the equipment being used.

At Purdue University, two basic strategies are used to provide these experiences for students. The first is to strongly encourage students to complete a two year program in Electrical Engineering Technology. The

program emphasizes a careful blend of theory and hands-on experiences in the basics of digital and analog technology, circuit theory, trouble-shooting, etc. When this is not pragmatic for the student's needs, a minimum of two non-major courses are often substituted. Both approaches are complemented by theatre courses relating these concepts to audio equipment and systems. The second strategy puts promising students in work-study and undergraduate assistantship positions as maintenance and repair technicians early in their education. This provides a regenerative pool of basic maintenance talent that is led by experienced seniors who tutor incoming freshman in an apprentice type relationship. The result seems to provide a reasonable foundation of theory and experience for the entrance level professional.

The educational process must provide this technical and engineering foundation as well as training in the processes of the designer and a good measure of hands-on experiences. The three educational strategies discussed above have many implications for the design of theatres and, therefore, for the consultants who are responsible for those designs. In the final part of this paper the implications for the consultant can be examined.

3 Implications for Consultants

3.1 The Need for Consultants

Given the complicated strategies and multiple functions of the theatres and sound systems described in the paper thus far, it should seem obvious that some outside help is needed to design sound systems for educational theatres. However, this is not always the case. Sometimes it is necessary to justify the consultant's existence.

Audio has evolved so rapidly that there are people who know how the systems work and what they want them to do but do not have the engineering background to design and install the system. Others are very good at installing the system but do not have the aesthetic vision to fully flush out the needs of the institution. It is very difficult for somebody who works full-time doing theatre to keep abreast of all the latest developments in theatre sound system engineering. A consultant deals with these on a day to day basis and is generally much more aware of the many products, techniques, and installations that can be adapted to the project at hand. A poor

design of a professional theatre will simply turn out to be a bad theatre. A poor design of an educational theatre will help turn out bad students, who tend to spread out into the theatre world like a kind of deadly disease.

3.2 General Guidelines for the Design of Educational Theatres

3.2.1 Matching the Facilities to the Staff.

The first and most important thing for the consultant to assess is the support structure for the sound systems planned. Who will control and maintain the facilities? How many other responsibilities vie for their time with this one? Do they have adequate personnel to maintain and repair high fidelity sound systems? How do the facilities fit in with the educational strategies of the institution? The answers to these types of questions yield a most important caveat to the educational theatre sound system consultant: NEVER SPEC A SYSTEM THAT THE INSTITUTION CANNOT PROPERLY STAFF AND MAINTAIN

Educational Institutions often allocate money in big chunks for capital purchases. This means that the staff/faculty size is not always proportioned to the facilities. If the consultant does not specify a sound system that is within the constraints of the Educational System it will quickly become damaged, abused, broken, stolen, or a host of other problems that will in effect render it useless.

It is also important to realize that at the time of this writing there is not a single full-time tenured faculty member in theatre sound in the country, and relatively few full time technical sound staff. Sound system size and complexity has exploded in the last two decades and the staff in educational institutions simply has not grown to match. This is a slowly evolving process, partially hampered by the educational institution's inability to adequately prepare students to fill these new positions. The situation is bound to improve, and the wise consultant will use this to an advantage.

The consultant can invest money in a system that is readily expandable and/or upgradeable in the future. This is one area where the educational institution has a clear advantage over the professional theatre. Educational institutions are naturally oriented towards the future. It is easier to justify an expense in this setting if the expense points to future developments in the field.

3.2.2 Simplicity and Flexibility.

One of the problems that educational theatre faces that is uniquely different from the professional theatre is the constantly changing nature of the users of the system. Typically a professional theatre may only have one or two persons who ever touch the sound system. By its very nature educational theatre sound systems may be handled by forty to fifty students per year. The professional theatre expects that its employees are professional and, indeed, know what they are doing. Quite the contrary, the educational theatre assumes that its students are not skilled, and expects them to make many mistakes in their educational careers. Some of the students using the system will be outstanding. Others will be mediocre to miserable (keeping in mind that this is a weeding out stage in many careers). Because of this it is important for the sound system consultant to design a system that is simple enough for the weak student and flexible enough to challenge the most outstanding.

There are several things the consultant can do to keep the system simple yet bulletproof. It is imperative that anything that affects the gain and/or room EQ structure of central clusters be locked out. It is generally best to separate microphone inputs and outputs on patch panels on separate patch panels, or at least physically isolated on a single patch panel. If possible, provide a separate amplifier for every speaker and avoid patch panels between the two. If the two must be patchable, use a physically different type of connector (e.g. twist-lock) for these patches than is used on the patch panel. Finally, normal the simplest system at the patch bay so that the less experienced students can understand and use the sound system easily.

Even though the system should be readily reducible to its most simple form, the needs of the more advanced student should be addressed. It is important to remember that a system that is right for one show is not necessarily right for another. For these reasons, it makes sense to try to design a system that is as flexible as possible. As Rolly Brook put it, "try to design a system that no director can come along and ask for something it can't do."

To do this the consultant must assess what the biggest need for this sound system may ever be. The consultant must then

specify more cables and conduit than seems reasonable. Although specifying empty conduit is usually frowned upon, it is acceptable to specify conduit sizes much larger than is necessary for the cable which is installed. All line level and microphone level cables need to be terminated at a sophisticated patch bay (remembering the normalling for the sake of simplicity).

Another concept that allows the consultant to design extremely flexible systems is the central equipment pool. This pool of equipment includes microphones, tape decks (playback only), mixers, amplifiers, a variety of different types of speakers, samplers and synthesizers, effects boxes and any other sound equipment that may be needed by any of the Educational Institution's theatres. This equipment can then be allocated to shows based on a pre-arranged priority system, so that the most important shows have access to the most/best equipment. Because a great deal of the equipment is not used in a single installation, the institution does not have to maintain as large an inventory. This also allows the consultant to specify many different types and brands of equipment to expose the student to as wide an array of sound equipment as possible (although this must be balanced with the maintenance need for redundancy, e.g. two of each piece). Finally a large equipment pool gives individual designers a great deal of flexibility in configuring the sound system to the show.

3.2.3 Four theatres typically found in educational institutions and their relationship to the teaching strategies.

One strategy discussed in the section on providing hands-on experiences was the need to provide a series of audio systems that grow with the student. There are four types of theatres that are common to most educational institutions. These four types will be discussed in order of increasing size, complexity and level of skill required. It should be noted that the general trend is for the amount of fixed equipment to increase as the size of the theatre increases.

The first level of theatre in most educational institutions is some sort of "black box" theatre. This is typically a room that has been painted black (hence the name) with very limited staging facilities. A very useful strategy is to provide no permanent sound equipment in this facility at all (not even cables, amps and speakers). Every show must be

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The first level of theatre in most educational institutions is some sort of "black box" theatre. This is typically a room that has been painted black (hence the name) with very limited staging facilities. A very useful strategy is to provide no permanent sound equipment in this facility at all (not even cables, amps and speakers). Every show must be

designed by the beginning student from the ground up. Since this is also the lowest priority level, the type of equipment available is very basic (in some cases, nothing more than a tape recorder, an amp, and a pair of speakers). Seating in these theatres is almost always limited to less than 200, many beginning classroom productions are staged here, usually without an admission charge.

In the black box theatre the student is first exposed to the design and execution of the basic building blocks of audio systems for theatrical sound. Since this type of theatre simulates working conditions in many professional houses (i.e. four bare walls), students gain practise in writing shop orders and specifying every detail of the system. This type of simulation also allows focus to be placed from the very beginning on the *processes* of theatre (e.g. rehearsal, communications, director designer relationships, etc.). Indeed, among the four types of educational theatres, the black box may be the best training ground for theatre sound students.

Having gained some experience in a very simple theatrical sound environment, the student is then ready for the next level, the flexible space/small stage. This is typically a theatrical space that can accommodate arena, proscenium and thrust type staging. Because of the nature of the space, very little sound equipment should be permanently installed. It is best to install a very flexible maze of low level and speaker level audio lines terminating at a fixed audio control position's patch panel during the construction period (They are a lot harder to add later). Amplifiers may also be permanently mounted, either one per speaker line or through some sort of amplifier/speaker patch panel. Since this theatre is one level up from the black box, it typically makes more use of the central equipment pool. The theatre typically holds from 100 to about 600 seats, is used as a showcase for graduate student productions and there is a small admission charge.

This second level still focuses on many of the basic skills and techniques of the black box theatre, but now expands the systems used to a level that is more typical of many professional settings. Emphasis continues to be placed on the processes of theatre and on fundamentals, but now there is likely to be a paying audience involved, and attention begins to focus more on the quality of the finished product.

The third level up is most often a fully equipped theatre with similarities to many regional theatres in the country. There is a great deal more equipment permanently installed in this theatre, especially when the theatre is of a fixed stage (e.g. proscenium) type. In addition to the very flexible low level and speaker level (with amplifiers) cabling system terminated in a patch bay in an in-house mixing position, one expects to find a proscenium cluster (with lock-out protection for the gain and room EQ), and a mixing console suitable for the types of productions staged in this theatre. This console is normalled at the patch panel for the most common and simple uses. This theatre receives a very high priority from the central equipment pool. The theatre may hold anywhere from 900 - 2500 seats and is generally used to stage the theatre department's premiere productions, highlighting the faculty, terminal year graduate students and other outstanding students in the department. Admission prices vary, and tickets are almost always available on a season ticket subscription basis.

This type of theatre experience is usually the last link between the student and the professional career. Because of this it is fitting that the emphasis in this theatre is almost solely placed on providing quality theatre as a service to the community. It is expected that students working in this environment have mastered the fundamentals and are now expanding their aesthetic and technical horizons in a near professional manner. Very few of the original group of students progressed this far. The ones that survive these final tests should have a good chance at a career in either professional theatre or a related profession.

The fourth type of theatre commonly found in most educational institutions is both the largest, and typically the one that is most outside the normal educational process. Nevertheless, it does have both a very real function and place in the system and in the educational strategy. This type of theatre is usually the show place for the institution and may be either an arena or professional roadhouse. The primary function of this theatre is to provide a service for the institution and the surrounding community. The theatre is not a money making operation, but usually charges for time labor and materials to break even. This economic base usually allows high quality entertainment to be

presented to the public at very reasonable prices.

As the largest of the four theatres, this type of theatre also has the most demanding equipment needs. It must be capable of handling the facility demands of all sorts of touring shows that transport their own equipment: Broadway, pop/rock/classical music, dance, lecture, etc. Simultaneously it must have a full complement of the highest quality sound systems to handle conferences, special events and touring shows that do not carry their own equipment, as well as a diverse range of in-house productions. Almost all of the equipment in this installation is fixed, and the house is usually staffed by members of IATSE (International Alliance of Theatrical Stage Employees).

The size of the houses very a great deal. An arena may hold anywhere from 7,500 to 18,000 seats, while a road-house environment may hold between 2,500 and 7,500 seats. Admission prices vary ,of course, in relation to the act. Many groups within the institution will book a series of events and offer these events on a season ticket basis.

At first glance, there does not appear to be any place for the theatre student in the road house environment. A touring show comes in with very specific requirements. The in house crew must be experienced and versatile enough to handle all areas. They may work well over 150 programs a year. In this environment there is no time to train students.

However, there is a mutually beneficial relationship that can be developed here. Almost all touring shows and in-house productions require additional stage hands above the normal full time staff. These stage hands are usually hired from a pool of paid student help. It seems likely that the highest quality students will be found in the theatre department. The educational institution now has an inexpensive and readily available talent pool, and the theatre student has a flexible hour job (that usually pays better than other student jobs). Even more important, the student is constantly exposed to a myriad of shows, each bringing in a different sound system. This exposure and the potential for networking often give the student new possibilities for professional employment. Some students serve an apprenticeship that leads to more responsibility in the large hall or acceptance into the IATSE union. In the ideal university structure, the heads of different areas (e.g. chair of Theatre Department and director of the

large hall) work together to complement each other's programs. The consultant should keep in mind the possibilities of integrating education when designing both this and other theatre sound systems.

3.2.4 Maintenance and repair facilities

In the ideal educational theatre environment there would be one or more full time technicians who were not only responsible for maintenance, repair and improvement of the system, but who supervised the undergraduate assistants in their hands-on maintenance and repair duties as described in the section on **"strategies for providing engineering and technical education."** More often, this will not be the case.

A workable compromise would be to try to combine the theatre shop with a *similar* facility. This could be the repair shop of the institution's physical plant, radio/television station, telecommunications department, etc. It is a better compromise to associate with a facility that has a person who specializes in sound, than a facility utilizing an audio-visual specialist. It is important for the Consultant to know the repair and maintenance arrangement (e.g. to determine whether a service contract clause needs to be specified), especially if the consultant is to make recommendations regarding those facilities.

The facilities must be capable of accommodating both the student work pool and the full time staff. It is also important that facilities include capabilities to repair problems that occur *outside* of the individual pieces (e.g. broken cable, headset mike repair, etc.). If the maintenance and repair staff supports the investment, the shop may be set-up with additional parts inventory, more sophisticated test equipment, etc. to handle internal equipment repairs and system improvements.

The types of theatres, their maintenance and repair facilities, and the relation of both to the academic programs should make up a good portion of the concern of the consultant. By keeping the sound systems as simple and as flexible as possible, and by limiting the scope of the system to the institution's resources, the consultant can help provide a valuable learning resource that is also very capable of servicing other functions of the institution (i.e. to provide a service to the community, and a setting for artistic expression and research).

3.2.5 Current Controversies and Their Relation to Education

One of the first and most disastrous cuts that gets made in the sound equipment budget is the money for a separate production room. It seems to be the one thing that the consultant is least likely to get, and the one thing that people in educational theatre clamor for the most. Tom Mardikes, who teaches theatre sound at the University of Missouri states that it is the most important thing: YOU MUST HAVE A STUDIO. It is one area that separates institutions that have viable theatre sound programs from the rest.

About the only similarities between a sound system for a theatre and a sound system for audio and music production is that they both involve sound. There are very few similarities after that. The mixer layout, monitoring, tape recorders, acoustics, and just about every part of the system are very different. Failure to address this key point will almost certainly hinder sound score designs to the point of mediocrity.

There are compromises that can be made that are acceptable. The first alternative is to slice away a part of the sound equipment budget, battle for some appropriate real estate (e.g. a separate room) and start an audio production facility. If a separate space is not dedicated to audio production at the outset, and audio production is shackled to the sound booth, there is little chance that the situation will ever change.

Another compromise that bears scrutiny is joining forces with other departments in the institution and developing a separate shared audio production facility as well as maintenance and repair facilities. There is a word of caution surrounding shared facilities, however. The old cliche' that "Politics in the University are so vicious because the stakes are so small" applies here. It is very difficult to get departments in an educational institution to work together, and even when this has been accomplished successfully, the next administration can easily come along and destroy the relationship. The best solution appears to be to either choose a head for the facility that has an appointment that is split between the departments involved (and thus administrates in a neutral manner), or to locate the facility under the administration of a neutral department (the Center for Instructional Services at

Purdue University is one such example).

When choosing between the two compromises discussed above, some pros and cons need to be considered. First, theatre is a process that is inherently prone to crises. It is important to establish a system of priorities in a shared facility that addresses the need for a quick turn around (e.g. highest priority given to whatever program has the next opening, air date, etc.). Second, consider that a small production facility has a great deal of potential to blossom in the future. The sound studio at Purdue (although far from ideal) started out as a pile of junked audio equipment on the floor of a 6' X 8' steel cage. Today it is located in a soundproofed facility that has over 600 square foot of studio space. Once the need for the facility is perceived, it will grow on its own accord.

One final note on the subject. If the consultant becomes involved in the design of the audio production facility, especially one whose primary function is to educate students, it is important to separate the vanity needs from the real needs. It may be more appropriate to design several small studios that provide a great deal more access time to a larger number of students than one large expensive one to be used as a playground for a faculty member. Another advantage of several small studios is the ability to specify similar but different brands of equipment, including MIDIed musical instruments, computers, mixers, etc. to increase the amount of exposure students have to different products. As money becomes available, the studios can be upgraded in the same manner as the theatres described earlier in this paper.

Another struggle that still endures is the need to locate the sound console where the operator can hear the show as *the audience hears it.* It may surprise many consultants to know that this battle is still being fought on a regular basis. Locating the sound mix position in a good listening position in the house has become almost standard procedure in professional situations (e.g. Broadway and touring shows). However, this battle has only been half won, for the sound score designer still finds that the sound board operator is usually located in a booth, unable to hear the director's complaints about poor sound board operation. The culprit here seems to be the tape recorder solenoid.

There have been several tape decks that have appeared over the years (manufactured by Uher, Sony and Ampex) that have

had transports that are able to be silently started. Given similar needs in the radio industry, it is strange that no professional tape recorder manufacturer has addressed this issue in the $2,000 -$2,500 price range.[4] The advent of digital tape machines and samplers promises to solve this problem once and for all (as well as searching and cueing). In the meantime the solution seems to be to either locate the mixer in the house and a tape operator in a booth or put the mixer in an enclosed booth and try to feed the program electronically to the booth. The first solution does not emulate professional practise well (the added expense of a tape operator is seldom justifiable in a professional setting), and the second does not allow the board operator to hear the show as the audience does. For intricate sound board operation, however, the sound board operator *must be able to hear the show as the audience hearts it.*

On another front, it is often said that there is no such thing as stereo in the theatre. A realistic stereo perspective can only be achieved for a very small fraction of the audience. Dan Dugan, who is one of the early pioneers of theatre sound score design, has put this argument into perspective quite nicely. He argues that a realistic spatial perspective is not necessarily the objective. Although the imaging will not be "correct," there will be an expanded spatial perspective for virtually every seat in the house, and this alone justifies the existence of stereo (including distributed front) speaker systems.

In all of the three previous controversies it is important for the consultant to identify the real concern that underlies the superficial arguments. In all three cases, the underlying concern is the battle for real estate. There must be a separate room for an audio production facility, the sound board takes up income producing seats in the house, and the distributed front speaker system takes up precious space on the proscenium. The best arguments the consultant can make in these cases almost always point to the need to provide the most functional theatre space in which sound and sight are given equal attention.

Another series of controversies that needs to be addressed for the educational institution the separation of audio systems. In a landmark paper published in 1972, David Klepper details the many types of *separate* systems required in theatres.[5] Examples are given in specific instances where compromises on

the separate system must be made, but treats each system ideally as separate. This article is still a valuable reference work for the theatre sound system consultant.

There are three areas where controversy has developed around the need to compromise to separate systems. In most cases, these compromises seem to be unacceptable.

In the first case, it is quite clear that the stage manager is the center of the communications world in the theatre environment. Yet it is often difficult to make the stage manager's desk the physical center of communications due to the a compromise that treats the production communications system as part of the sound system. This usually means that the central control for the stage manager's panel is physically located in the sound booth. It seems that the production communications system is most functional when it is totally removed from the sound board operators area and responsibility and placed with stage management personnel.

The consultant should not underestimate the need for archival recordings of a high-fidelity nature. If separate mixing areas and facilities are not provided the system may produce either bad audio for the archival recording, or for the live show (depending on who's paying the most money). Klepper suggests "Where recording requirements for a particular theatre are minimal and the expense of space for a separate archival recording system cannot be justified, then the reinforcement system (for pick-up and control) and the effects system (for recording) should be designed to permit recording of live events when required."[6] It should be clear that an archival recording intended for rebroadcast would not fall under the category of a "minimal requirement."

This section of the paper has addressed some of current controversies that have important implications in the teaching strategies for the educational institution. In each case, the best approach for the consultant for educational theatre seems to be to fight for the solution that is closest to what the professional industry might achieve in the future. In this way, students may be trained to enter the professional world already inclined to better solutions, and this could facilitate better sound in professional theatre.

4 Conclusion

This paper has attempted to provide an in-depth discussion of very real differences between designing a sound system for a professional theatre, and designing a sound system that must work within the structure of an educational institution. Several key concepts have been traced throughout this paper: 1.) the difference between money in professional theatre and time in educational theatre; 2.) the need for educational theatres to emulate practises of the professional theatres; 3.) the need for the consultant to work within the staffing constraints of the educational institution; and 4.) the need to specify a system that is future oriented. It is sincerely hoped that this paper will contribute to an increased understanding of the role of both sound and education in theatre, and that the result of this increased understanding will manifest itself in a better professional theatre in the future.

5 References

[1] D. Klepper, "Theatre Sound and Communication Systems," *USITT Theatre Design and Technology,* pp. 11-19, (1972 February).

[2] D. Klepper, ibid.

6 List of Figures

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[1]A similar problem is that there is often no distinction in professional theatre between "good" and "ontime.," e.g. any piece of equipment that solves the problem now is better than the "best" piece of equipment to solve the problem later.

[2]One of the best ways to cope with this problem of forced obsolescence is through the financial support of the industry these programs nourish. In a mutually symbiotic relationship such as this many of the greatest practitioners of theatre have emerged.

[3]A recent survey of graduates at Purdue University showed that the highest priority of graduates (who found employment in the industry) was to get more hands-on experiences in students' college education.

[4]This situation is complicated by the need to have the tape transport sense leader tape and automatically cue up for the next cue. In recent years, the only tape deck in this price range capable of this was the Revox PR99. However, Full Compass Systems in Madison WI now markets a device manufactured by TTS called the Auto Cue that will retrofit to any tape recorder and performs the same function.

[5]D. Klepper, "Theatre Sound and Communication Systems," *USITT Theatre Design and Technology,* pp. 11-19, (1972 February).

[6]D. Klepper, ibid.

"Midsummer Night's Dream" Notes (Revised 2/25/88) Page # 1

Production Notes

THE PRODUCTION CONCEPT

The two different worlds of the play show the sharp contrast between people as they sometimes appear (the real world of the King, Queen and their court), and the primeval subconscious forces that drive them (the dream world of Titania and Oberon). The real world is white, well ordered and structured; the dream world is dark and illogical. While we are in the dream world, everything appears to be logical. But when we return to the real world at the marriage ceremony we perceive the dream to have been illogical. Still we bring things from this illogical dream world to our well-ordered existence and those things enrich our lives. In this way we communicate to our audience that this primitive and pagan side to human nature is not bad, it just is.

The working image for the show is the dichotomy of eating food. We eat our food at beautifully set tables of sterling silver and fine linens. But these are animals that have been savagely killed, and slowly burned. The act of eating itself involves the grotesque ripping apart of animal flesh (chewing) and then plummeting the remains into a vat of acid (our stomach). Truly we must keep in mind, therefore, that these are not different worlds, but ways of looking at the same thing. The mechanicals are of course oblivious to this dichotomy--they're view of life is much more pragmatic and mundane, and they remain the same in either view of the world (i.e. real vs. dream).

The Dream in this production really starts when the fairies enter for the first time. Theseus underlying behavior motivation is to party. This becomes manifested in the world of Oberon and Titania. It is a world populated by satyrs that is out of control, where the laws of Physics no longer hold. Oberon and Titania's entrance resembles a tornado. At its darkest, it resembles the paintings of Bosch and Blake.

To communicate this we will use a theatre that is stripped of its tools. It is an abstract production in the sense that the performance must only deliver the essentials of the communication (abstract is defined as a version of a larger work produced by shortening without basic alteration of intent or language). There is no room for excess here--every element of the production must have a specific function in this communication.

It is also important to distinguish between satire and humor in this production. Shakespeare truly likes these characters--including the mechanicals--and is therefore not laughing at them. It is equally important in the production that we reveal the humor of the situation without laughing at the play, the world or the characters. For instance, the first love scenes Shakespeare writes are legitimate. It is only when the lovers go into the forest and the dream world that Shakespeare shows us the humor of "falling in love." And even in this humor, he is not laughing at the characters, but simply making light of our human condition.

THE SETTING

The setting is basically an explosion of white from a "magic" space located somewhere over the heads of the actors--perhaps a Greek column center stage. The first part of the play will be confined to the stage proper, but when the fairies arrive, the play "explodes" into the house. We lull the audience into security and then put them right in the middle of the darkest part of human nature. When we enter the dream world the Greek column that epitomizes our ordered and structured world disappears and is replace by a pagan sculpture that elicits a darker more erotic response. When we return to the court for the wedding we may find that some of the scenery of the dream world has found its way into this real world.

THE COSTUMES

The musicians will all be in white, the court in formal Greek attire , and the mechanicals in archetypal working clothes. The young lovers enter the dream world in stereotypical prom dresses and tuxedoes. The King and Queen and their attendants are very animalistic--a combination of exposed skin and hair loosly covered in moss and burlap, and ornated with lots of jewelry, e.g big gold earrings. Hair styles may be shocking as if the hair itself has exploded out of control.

THE MUSIC

The music of the court is civilized, a harpsichord and classical guitar. The opening theme uses the melody from the final dance of the play (Titania's requested song p.185). This is followed by a romantic classical guitar theme that will later be used when the lovers wake up under the magic spells in the dream scene (Love Theme). A Reprise of the court scene ends the first court scene.

We shift to the Quince's house where the mechnicals are rehearsing with sound provided by a baritone sax player. The music of the mechanicals is 9 to 5 working man's music, and is punctuated by clock type effects like a cuckoo clock, factory closing whistle or bell tower chiming. The end of this scene plunges the audience from lightness into darkness.

In the darkness we hear the first snatches of a song. As the intro plays a spotlight comes up on the lead singer of the band (Carrie Newcomer). Attendants sneak out of the Up Left closet door. The song (Over Hill, Over Dale) explodes into a heavy rocker and plunges the audience into the Dream World. The dream world is a combination of pleasant dreams and nightmares in a pagan and primitive world. The melodies are catchy themes that emphasize the erotic and sensuous subconscious impulses of humans. They use color at will-guitars, synthesizers and sampled sounds, a wide range of percussion instruments and the human voice. This music constantly tries to contain the more primitive sounds: tympani, volcanoes erupting, thunder, marimbas, steel drums, bells and synthetic sounds that are the magic layer to the dream world.

Demetrius is chased by Helena right in to the middle of this dream world. Their entrance music is still played on classical guitar, but now the song is not a classical one but "That's the Story of Love," a jazzy rendition of a pop standard which underscores their entrances in prom dresses and tuxedoes.

FIG. 1 Design Statement

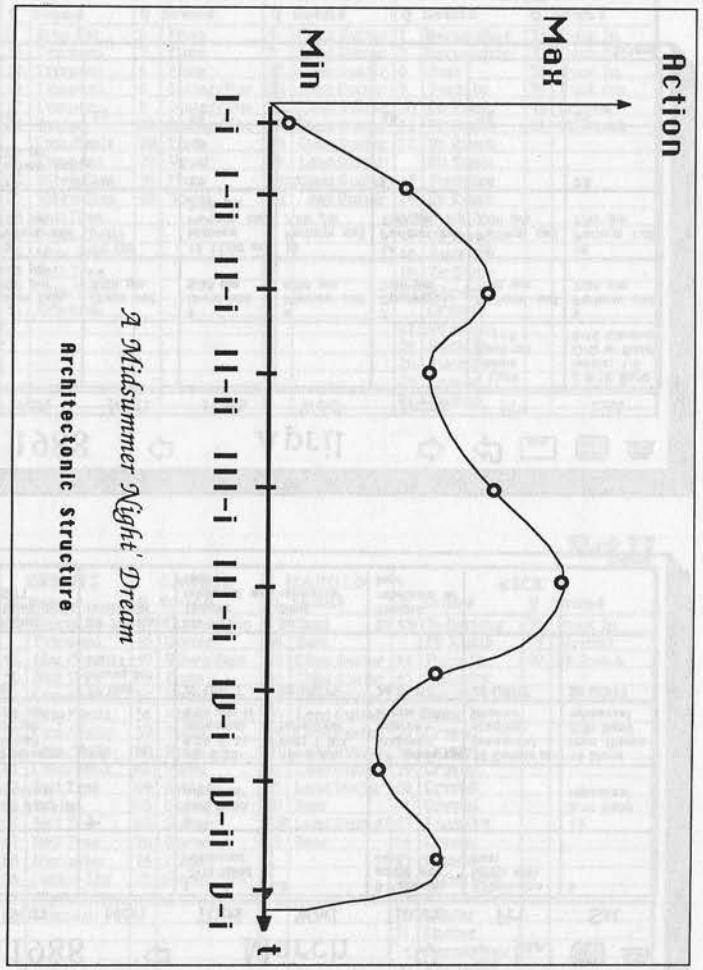

FIG. 2 Architectonic Structure

1988 ⇦ March ⇨

Sun	Mon	Tues	Wed	Thurs	Fri	Sat
		1 7-11 Band Rehearsal	2	3 Rehearse songs with cast	4 Rehearse songs with cast	5
6 6:00 Band rehearsal	7	8 8:00 Band rehearsal	9	10	11	12 3:30 Band rehearsal
13 Move to Pierce? 1-5 reh 7-11 reh	14	15 6:30-9:30 T &L rehearsal 8:30 add H	16 5:30-8:30 T & L rehearsal	17 rehearsal staging/ improv- Dennis @SB	18 Dennis at rehearsal-staging/ improv	19 Move from Pierce 3:30 Band rehearsal
20	21 Rick leaves for USITT	22 USITT	23 USITT	24 USITT	25 USITT	26 USITT
27 Rick returns from USITT	28 7-11Band rehearsal	29 7-11 Theatre rehearsal w/ band	30 7-11 Band rehearsal	31 7-11 Theatre rehearsal w/ band		

Extend

1988 ⇦ April ⇨

Sun	Mon	Tues	Wed	Thurs	Fri	Sat
					1 Light Levels Band reh 8-11?	2 9-12 Band levels; 1-5 Q-Q w/ Band 6-12 Cleanup
3 Dress calls 1:00 pm 6:30 pm	4 Dress call 6:30 pm	5 Dress call 6:30 pm	6 Preview call 6:30 pm	7 Opening call 7:00 pm	8 Perform call 7:00 pm	9 Perform call 7:00 pm
10 Perform call 5:00 pm	11 Off	12 11:00 am Matinee Perform call 7:00 pm	13 Perform call 7:00 pm	14 Perform call 7:00 pm	15 Perform call 7:00 pm	16 Perform call 7:00 pm
17 Perform call 5:00 pm	18	19	20	21	22	23
24	25	26	27	28	29	30

Extend

FIG. 3 Production Calendar

"Midsummer Night's Dream" Preliminary Sound Cue Sheet (Revised 2/25/88) Page # 1

Cue	Sound	Cue	Mus	Description	Page
1	PreShow	House Opens	HLNT	Musicians wander out, tune up, maybe play, maybe not. We get to hear some of the show colors.	41
2	Procession 1	Blackout	NT	Starts as a harpsichord minuet arrangement of main theme. The lights come up on stage of white characters ala George Segal sculptures. This piece must be playable in the dark!	41-0
3	Procession 2	EGE: we follow you	NT	A short version of Opening to get characters off stage	45-127
4	In Love I	Exeunt	HN	A Harold classical guitar solo segues from end of Processional #2. This is "in love" music from Harold's repertory.	45-128
5	In Love 1	HER: poor Fancy's followers	HN	Music ends.	46-155
6	Mechanicals 1	HEL: and back again	P	The mechanicals enter from way down the hall led by Roger on sax	50-151
7	Mechanicals 2	BOT: it in either	P	Something from Roger to get the Mechanicals off stage.	53-93
8	Over Hill, Over Dale 1	Blackout	HLNT	Carrie's first song starts in darkness.	54-111
9	Puck 1/Dream 1	BOT exits	T	Puck's ID for coming and going. First occurence stops song but sustained tones continue until OBE and TIT entrance	54-111
10	Oberon 1	PUC: never wasted there.	LT	Tympani and Rumblings underscore OBE entrance, and cuts off sustained tones	57-56
11	Titania 1	PUC Here comes Oberon.	T	Electricity/static noise (the crackle of lightining before the thunder) underscores TIT entrance	57-57
12	Titania 2/ Oberon 2	TIT: Longer stay	LT	Static covers her exit, and rumblings underscore the next bit of plot.	60-145
13	Puck 2	PUC: In forty minutes!	T	Backward version for when Puck disappears.	61-176
14	Oberon 2	OBE: page to me.	LT	Music ends/cuts off with new character entrance	61-185
15	Glory of Love 1	DEM enters	H	another Harold solo--played for laughs against Demetrius/Helena rejection scene?	61-188
16	Puck 3	OBE: seek thy love.	T		63-246
17	Oberon 3	OBE: give it me.	LT	Continues to build from last hearing.	64-249
18	Puck 4/Oberon 3	PUC: shall do so.	T	Puck sound cuts off Oberon 3	64-268
19	Titania 3	PUC: shall do so.	T		64-268
20	Lullaby 1	TIT: let me rest	HLNT	Carrie's second song. The fairies help chase away the evil spirits.	65-8

FIG. 4 Preliminary Sound Cues

Color Chart — Act I

DENNIS		CARRIE		HAROLD		RICK			
Q	Sound	Q	Sound	Q	Sound	Q	Sound	Q	Sound
8	Trap Set	2	Flute	4	Class Guitar	1	Harpsichor	33	Puck In
10	Tympani	3	Flute	8	Lead Guitar	3	Harpsichor	35	Puck Out
12	Tympani	4	Flute	15	Class Guitar	8	Bass	36	Puck In
14	Tympani	8	Guitar/Voc	20	Lead Guitar	9	Puck In	37	Puck Out
17	Tympani	9	Guitar/Voc	23	Class Guitar	10	Ob Rumb	40	Crystal
20	Tablas	20	Guitar/Voc	27	Class Guitar	11	Tit Static	41	Ob Rumb
	Cym/Bells	28	Flute	28	Class Guitar	12	Ob Rumb		
21	Tympani	29	Vocal	29	Lead Guitar		Tit Static		
22	Vibra Slap	39	Flute	39	Class Guitar	13	Puck Out		
25	Vibra Slap	40	Vocal	40	Lead Guitar	14	Ob Rumb		
28	Bell Tree					16	Puck In		
29	Cymb/Bells					17	Ob Rumble		
36	Misc Perc					18	Puck Out		
39	Bell Tree					19	Tit Static		
40	Cym/Bells					20	Rhodes /		
41	Tympani						Crystal		
						21	Ob Rumb		
						24	Puck In		
						26	Puck Out		
						29	Crystal		
						31	Cuckoo		

Act II

DENNIS		CARRIE		HAROLD		RICK			
Q	Sound	Q	Sound	Q	Sound	Q	Sound	Q	Sound
43	Marimba	43	Guitar/Voc	43	Bass	43	Didjeridus	78	Puck In
	Tympani	46	Guitar	46	Bass		Ob Rumb	79	Strings
46	Mar/Tymp	47	Vibra Slap	49	Class Guitar	44	Puck In	80	Ob Rumb
50	Bell Tree	50	Flute	50	Class Guitar	45	Puck Out		
51	Cym/Bells	51	Vocal	51	Lead Guitar	46	Did/Ob Rum		
56	Cym/Bells	56	Vocal	56	Lead Guitar	48	Puck In		
59	Cym/Bells	59	Vocal	59	Lead Guitar	51	Crystal		
60	Cym/Bells	60	Vocal	60	Lead Guitar	56	Crystal		
61	Cym/Bells	61	Vocal	61	Lead Guitar	59	Crystal		
62	Bell Tree	64	Guitar	65	Lead Guitar	60	Crystal		
65	Tablas	65	Guitar	68	Bass	61	Crystal		
66	Bell Tree	68	Guitar	76	Lead Guitar	63	Puck Out		
67	Bell Tree	76	Guitar	79	Bass	64	Crystal		
68	Marimba	74	Flute			65	Rhodes		
76	Cookie Sht	79	Guitar/Voc			68	Didjeridus		
79	Glock/Cym					69	AlarmClock		
80	Tympani					70	Shofar		
						71	Shofar		
						74	Harpsichor		
						76	Acc Bass		
						77	Chimes		

FIG. 5 Color Chart

CUES
NOTES
TITLE

A Midsummer Night's Dream

DATE: 2/26/88
FORMAT: 2 Track Stereo
SPEED: 15 I.P.S.
ENGINEER: RKI

DECK A

CUE	SOUND	TIME
5.2	Voice 1	:18
5.3	Voice 2	:23
5.4	Voice 3	:20
5.5	Voice 4	:17
5.7	Voice 5	:13
5.8	Voice 6	:27

FIG. 6 Cutting Order

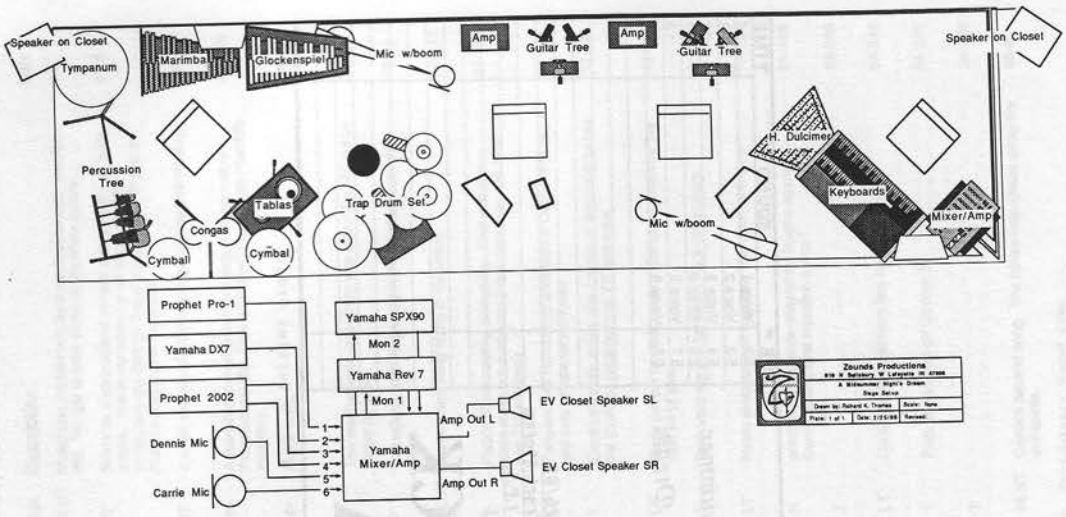

FIG. 7 Set, Mic, Speaker Plot

Production A Midsummer Night's Dream **Page** 1 **of** 1

Designer Richard K. Thomas **Date** 5/11/88

Cue #	Speaker Pre-Set	Description	Cue	Sound	Notes	Pg
1	1,2	A'_{LR} → ___ E.C.	HOUSE OPENS	VOICE 1		41
2	1,2	A'_{LR} → ___ E.C.	BLACKOUT	VOICE 2		41
3	1,2	A'_{LR} → ___ E.C.	EGÉ: WE FOLLOW YOU	VOICE 3		45
4	1,2	A'_{LR} → ___ E.C.	EXEUNT	VOICE 4		45
5	1,2	A'_{LR} → ___ E.C.	HER: POOR FANCY'S DEAD	VOICE 5		46
6	1,2	A'_{LR} → ___ E.C.	HEL: AND BARKAIN AGAIN	VOICE 6		50

FIG. 8 Cue Sheet