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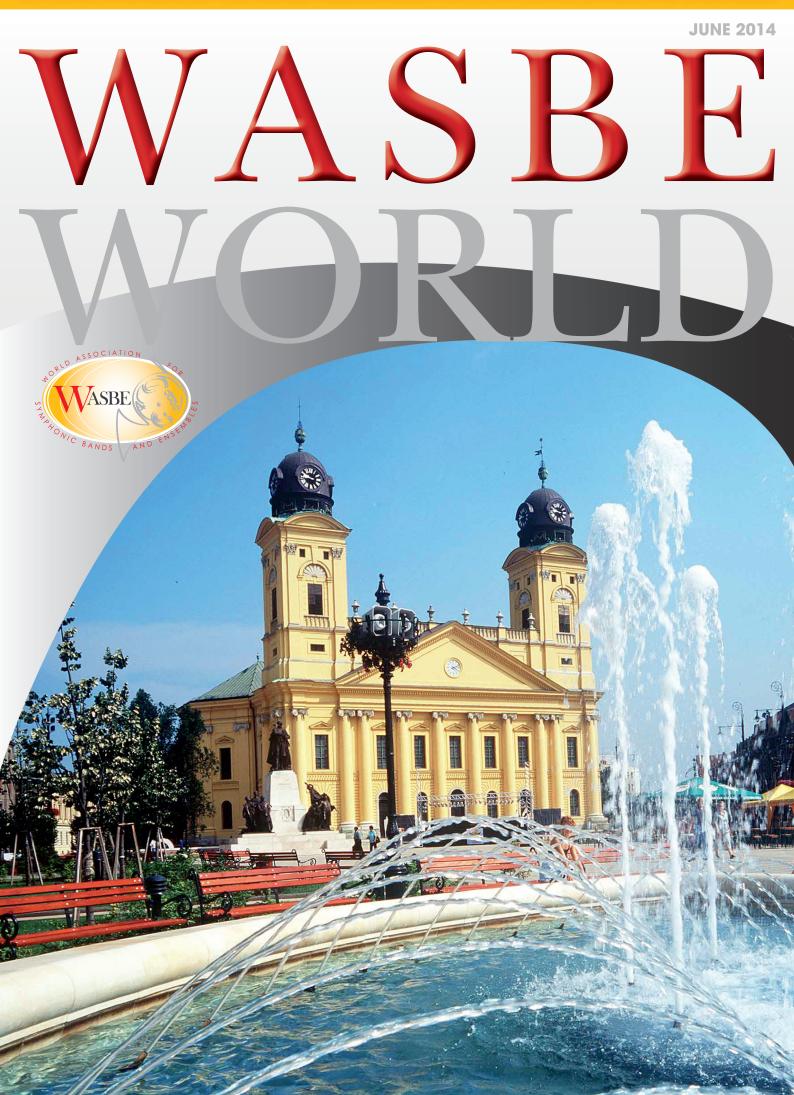
WORLD ASSOCIATION FOR
WASBE
SYMPHONIC BANDS AND ENSEMBLES

The e-Frontier: Electroacoustic Music, Multimedia, Education, and Audiences in the Digital World (Part 1)

by Alex Shapiro

The abundant sound of an acoustic symphonic wind band is one of the grandest things I've ever *felt*. And, heard. Augment it with the sonic landscape of a stereo audio track, and the emotional impact of the ensemble can be nearly overwhelming in its beauty and power.

We don't just hear music with our ears, we absorb it through our entire body. Audiences accustomed to live music lunging at them from the stage, are now embraced by additional sonorities streaming through speakers from the left, the right, and sometimes even from behind. It is this potent combination of expressive, sensual forces that drives me to compose music for electroacoustic wind band.

During the 1980's and '90's, I made a very modest living in Los Angeles, California, scoring low-budget film and tele-vision projects. Like any composer in that business, I put together a professional recording project studio filled with the latest sequencing, sound design, and engineering applications. Having worked with electronic music since 1977 when I was 15, I became adept at using these newer, ever-improving tools to produce soundtracks in any genre when, regrettably, there was no budget for live musicians. The majority of underscores for almost all present-day television shows and many feature films is electronic, or largely so with the addition of only a few live players – whether the track emulates actual instruments with samples, or uses sounds that cannot be achieved any other way.

In the late 90's, I shifted my career entirely to writing for the concert stage, and composed a great deal of chamber music for small ensembles. While much of it was purely acoustic, I grew increasingly interested in using my digital studio to incorporate a prerecorded track in the instrumentation, to accompany a soloist. That curiosity, and the natural progression that followed from it broadened significantly when I began writing for wind band. "Why not," I asked myself, "put these two magical sound worlds together?"

The nature of the beasts: the audio track, and the composer

In each of my electroacoustic symphonic band works, I treat the prerecorded track as an organic, additional section of the ensemble that has its own distinct sound. The woodwinds, the brass, the percussion, the rhythm section, and yes, the lonely upright bassist, all have unique timbres and

Lots of helpful information, not the least of which is a whale glissando, in BENEATH, the final movement of IMMERSION.

textures. Adding the audio track provides a different sonic color that enriches, expands, and contrasts the entire palette.

I usually compose vertically, measure by measure and phrase by phrase, orchestrating all of these sections simultaneously, as opposed to writing the acoustic parts first and then adding the electronics as an "accompaniment track," or, creating the track and then orchestrating for the musicians atop that. I take a holistic approach to composing that results in an evocative, and potentially enormous wall of sound. My intent is to seamlessly meld the live and recorded elements in such a way that listeners cannot tell where one begins and the other ends. My goal is to use this extended palette to create music that connects in unexpected ways with those who perform it as well as with those who hear it.

I don't use emulative samples; there's no reason to duplicate the sound of an actual instrument, when that instrument exists in the band and can be played by a living, breathing (sometimes gasping) human being. To me, the artistic joy of adding electronics is to devise original sounds that can't be produced by the musicians (unless maybe you pinch them hard, and I've heard they don't like that very much).

When I begin a new piece, I give a lot of thought to defining what I'll attempt to communicate during the journey, and to devising the map, somewhat determined by the targeted duration of the piece. Once that architecture is roughly in place, I collect the sonic elements of the soundscape that support the emotional direction of the music. Is it ambient and ephemeral? Are the pitches floating and variable, or are they literal? Is it wildly percussive? I often spend a couple of weeks putting the first iteration of my sonic paintbox together, as I cull existing sounds and original samples that will form the audio "section" of the band.

I'm aware that as the music writes itself (courtesy of very kind muses I bribe to show up for work with me, by offering them good coffee, dark chocolate, red wine, and anything else they demand as payment that won't get me arrested), this initial set will expand and change: sounds I loved and thought I'd surely want to use will suddenly have no place in the piece, and other audio gems will be discovered. I very much take to heart the advice of Sir Arthur Quiller-Couch, who said to improve one's creative work one must be willing to "murder your darlings".

Composing is very much like sculpting: we seek the shape, the truth, and the message from an undefined and amorphous starting point. A composer proficient in the digital realm and armed with a well-equipped project studio, is able to use his or her imagination to decide what kind of sound, timbre, or frequency, s/he would like to hear in each portion of the music, just as one makes a choice whether to use a flute or a trumpet on a particular melodic line. Once I know exactly what sound I want, I go about designing it, usually in one of two ways.

Creating the soundscape

The first method is to start from scratch and create audio samples by recording sounds that I find (such as the Pacific Humpback whale song I use in IMMERSION and its third movement, BENEATH), or that I make (for instance, water sloshing in a metal bowl, for my piece LIQUID COMPASS). I use an audio editing application, in this case DSP-Quattro, to carefully "clean" the samples by adjusting the start and end points, removing background noises or hum, and equalizing the frequencies to my liking. Then I import them into a sample

Instruments, water sloshing indications, and electronic sounds in LIQUID COMPASS.

playback application, such as MOTU's MachFive3. From there I map each sound across different pitches, and trigger those pitches via a controller keyboard. More sonic tweaking will occur further down the road, as I choose effects and any other filters to enhance the samples in the context of the music. A slosh is not a good slosh without this level of detail. (Think about this next time you're in the kitchen washing the dishes).

The second way many composers work, once we know roughly the sonority we want, is to peruse the massive folders of existing sounds found within the virtual instrument libraries that take up a great deal of the space on our external hard drives. Once we find something relatively close to what we're looking for, the following step is to use the remarkable tools found in applications such as Kontakt, MachFive3, Omnisphere, Absynth, or countless others that allow us to significantly alter the sound file, to achieve the exact nuance we have in our head as the composer. This can involve changing the envelope (the timings of the attack, the decay, the sustain and the release), running it through filters that affect its frequencies, panning it for further stereo effect, EQing it, adding delay, phasing, chorus, detuning, reverb, or the myriad other effects processes, and so on. The possibilities are nearly limitless.

I often say that composing is the perfect job for a control freak. Doing so for an acoustic score – marking every note, articulation, dynamic, and slur – is a spectacular opportunity for the basic, garden-variety control freak who realizes (with great consternation) that once the music is in the hands of actual instrumentalists, it will be altered to some degree. But what about when that composer creates an electronic track, and painstakingly adjusts each sound to extremely specific details that never change? Well, that brings the *Average Composer Control Freak* into the realm of *Executive Composer Control Freak Pro Deluxe!* The track will always play back the same, performance after performance.

Benefits to students

In addition to the thrill of offering audiences a big, cinematic sound experience, electroacoustic wind band pieces present many advantages to the musicians who bring the music to life, each of which is further amplified for younger, less experienced musicians who have yet to develop their range, breath control, intonation, and rhythmic sophistication.

Conductor Jerry Luckhardt

The track can include frequencies beyond the range of the players:

It's important to compose music for younger players that is as compelling as music written for a professional ensemble. Some composers cite the inherent range limitations as one of the challenges of writing music for students, but I am not among them; there are sophisticated pieces at all playing levels that use an economy of notes. The advantage of composing a track is that we can provide the highest and lowest frequencies that students either can't yet manage, or that a band is simply missing in its instrumentation. It's not uncommon for a junior high school ensemble to lack a piccolo or a contrabassoon, and a composer can take that into account when creating additional frequencies in the track.

Additionally, for college and professional bands with a full complement of instruments, a composer can take the prerecorded electronic element into the sonic stratosphere or basement, far beyond the playable range of any instrument. Just as with acoustic orchestration, a wide use of registration brings with it an enormously expansive sound. Thinking like a recording engineer and spreading the location of these sounds by using panning, delays and other techniques, suddenly imbues the music with a powerful, otherworldly quality.

The track can include complex rhythms – and improve morale:

A great deal of existing older band repertoire is written in stiff, sometimes plodding, regular meters that rarely change, and even more rarely are notably syncopated. In an electroacoustic piece, even if the musicians

are not yet capable of elaborate patterns, the track can provide a wildly sophisticated approach to rhythm, while the notes played by the musicians fall on more predictable beats. The result is a piece that sounds far more mature than the norm for younger players, with the added bonus that students will feel accomplished and inspired by sounding a little better than they are!

The track can include a subtle melodic or rhythmic guide, and assist with intonation:

To support both the players and the band director, a composer can add a "guide track" that helps anchor the band to the track. It's possible to include some of the melodic or bass lines and mix them at a lower volume than the rest of the soundscape, so that the audience won't hear them, but the practicing musicians will. Another technique I use is to double some or all of an instrumental line with a unique sound of my own creation, including this prominently in the mix and thus bolstering the sound of the entire band.

The track can be made available to students so that everyone can practice with the music at home:

Students are eager to hear and absorb the audio track. The more they do so on their own, the better the rehearsals in the band room will be. I always encourage the band directors to share a private link with the ensemble.

Audio: prerecorded, and live

Essentially there are three different methods composers use when producing an electroacoustic band piece. The first is the simplest, and the one that I choose for each of my works: using a prerecorded audio track that will reliably (one hopes!) play back via a free application such as iTunes or Audacity on a laptop, or even via that antiquated shiny object known as a CD.

Other ways of generating sound involve live electronics. One method is entirely interactive, often using an application called Max/MSP which can control visual effects as well as audio. The composer can program a sequence of patches in such a way that various sonic (or other) events occur, each triggered by what is played by the live ensemble.

Another related method is a combination of the two, whereby existing, prerecorded events are individually triggered in real time by someone at a laptop, using an application such as Ableton Live.

The sophistication of what can be achieved with these real-time techniques is unquestionably wonderful. Nonetheless, I have witnessed too many stressful occasions

when the programs did not run smoothly, or crashed entirely and rudely truncated a concert. In my own pieces, I continue to opt for straight playback that requires no human counterpart – and I advise my far braver colleagues to create prerecorded backups of their live electronics whenever possible, if only to have a Plan B at the ready, just in case.

The composer as engineer

Understanding the engineering concepts involved in creating a successful audio track mix becomes a crucial aspect of composing electroacoustic music. The composer is no longer just a writer, but now a recording engineer and record producer (cool sunglasses and pony tails are optional). Even if the track is outsourced for mastering (a process that balances the levels and frequencies), a composer still needs a solid understanding of what will – and what might not – sound good alongside the acoustic instruments.

Among the most important aspects of a successful track is frequency placement. All music, acoustic or electronic, is comprised of layers of sound frequencies from the very low to the very high. The beauty of a wind band or orchestra is that the ensemble represents a broad spectrum of these sound colors, and that's of course why well orchestrated pieces are so satisfying to hear.

When composing and later mixing the audio track, in order to avoid a muddy sound, it's a good idea to consider the vertical array of musical lines and frequencies, and to try not to have them clustered tightly together in the same sonic spaces unless that is the desired effect. Each frequency should have its own place in the mix, and this can be further enhanced by the virtual placement of the sound using panning techniques.

Adding a live ensemble into the mix means that there are more frequencies – plus, overtones and ring-outs – to consider. What might seem feasible in one's home studio can end up sounding quite different in a large hall. Experience becomes an excellent teacher!

The click track

In all but the most regular, percussive pieces (like my groove-based TIGHT SQUEEZE), a click track is necessary in order for the conductor to keep the ensemble in exact synchronization with the audio track. Depending on the needs of a piece, two kinds of click tracks can be used: one with fixed audio clicks that are even and regular, and the other with variable clicks, that reflect changes in tempo like rubato, accelerando, or ritardando. Any combination of beat patterns can be incorporated, to easily represent complex meters or serve specific conductor requests.

The click can either be mixed to one ear, or combined on both the left and right along with the stereo audio track. Downbeats are louder or different timbres, and the click volume is high enough to compete with everything else and keep the conductor on track – literally!

New skills for conductors

It usually doesn't take long for a conductor to become comfortable with the click and audio track in his or her earbud or headphone, but there are adjustments to be made. The most startling one is that suddenly, the conductor is not the one making the tempo choices! (And we all know what control freaks conductors are – that's why they get along with composers so well.) The track is fixed, and will play back the same way, every time. The click becomes the "anti-conductor." It might fly in the face of what the human being on the podium would opt for at certain points in the music. The person holding the baton quickly becomes a savvy time keeper, while still finding ways to preserve musicality and natural flow within the confines of a strict pulse. Depending on the music, there are creative ways to "give away" time to allow a short section to breathe, and then "pay it back" a little later in the piece so that everything stays in sync.

Part of the fun of wearing a headset and conducting to a click, is that it instantly turns any band director into a Hollywood

scoring session conductor, using the identical techniques with which blockbuster movie scores are recorded.
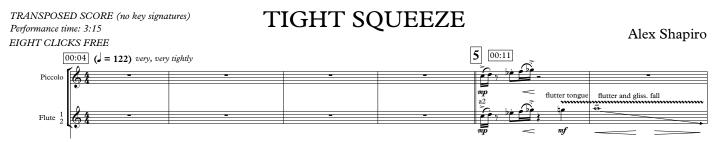
Notation: what's in the score

Most conductor scores for electroacoustic pieces look remarkably like any other score. They normally include a note at the start stating how many "free clicks" there will be prior to the downbeat, and the one or two measure lead-in time is usually included in the timings because that's where the track will play from. Those timings will be to the second, and used for reference against the track. These timing indications are most often located at double bars and rehearsal numbers (or letters), so that it's easy to pick up a cue in the middle of the piece by moving the counter in iTunes on the laptop (for instance) a little before the timing on the rehearsal number downbeat.
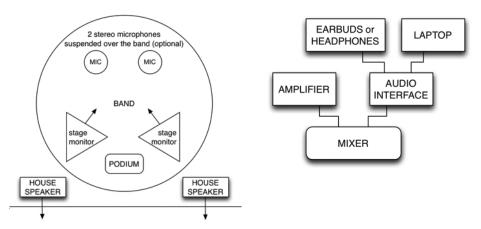
For even more control, the audio track can be split into what are referred to as regions, which behave like separate tracks from which a conductor may start. There are usually one or two music staves at the bottom of the score that represent what is heard in the track. For additional clarity, text, in or outside of boxes, is used to describe sounds and effects that can't be easily notated. Some composers rely heavily on graphics. I use a few obvious or artistic ones sparingly. But being a ridiculously practical person, I like to make the score-reading process as immediate and easy as possible. So if a sound cannot be notated by pitch or rhythm, I'll enter a very brief text description.

Hooking it all up: rehearsal and performance setup

Fortunately, the technical requirement to rehearse and perform electroacoustic pieces is very simple. Both the rehearsal room and the performance venue will need a basic PA system (mixer, amplifier, house speakers), ideally with stereo stage monitors that can play loudly and facing the band. If possible, another set should be placed in the back of the stage near the percussion section to

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TRANSPOSED SCORE (no key signatures)
Performance time: 3:15
EIGHT CLICKS FREE

TIGHT SQUEEZE

Alex Shapiro

Click track information and timing indications for TIGHT SQUEEZE.

2 stereo microphones
suspended over the band (optional)

MIC   MIC

BAND

stage monitor   stage monitor

PODIUM

HOUSE SPEAKER   HOUSE SPEAKER

EARBUDS or HEADPHONES   LAPTOP

AMPLIFIER   AUDIO INTERFACE

MIXER

Monitors, speakers, laptop, audio interface, and microphones, if desired, are connected by cables to the mixer, which is usually centrally placed in the back of the auditorium, or otherwise, on the side of the stage or next to the podium. It's helpful to also have one or two stage monitors at the rear of the stage, so that the percussionists can clearly hear the pulse of the track.

ensure that everyone hears the same downbeats. Sometimes percussionists – particularly anyone playing drum set – are given an earbud with the click so that they can stay in sync with the track. Even though the eyes of the band members are on the conductor, their ears are most likely tuned in to the drummer! If the drummer deviates from the actual tempo, the whole band usually

follows. This makes the conductor's work more challenging as he or she strives to bring everyone back into sync and avoid the piece becoming a wager-worthy sporting event where bets may be placed on which section crosses the double bar first.

There are normally at least two audio files that come with a score. One is the audio track in its stereo performance mix that will

be heard over the stage monitors by the band and over the house speakers by the audience. The other is a mix for the conductor that includes the audio track mixed with a click track for in-ear monitoring through headphones or earbuds. Sometimes a conductor chooses to leave one ear uncovered, in order to clearly hear the live band against the track.

For the conductor, any stereo earbuds or headphones will work. In a perfect world, a wireless, single-ear summed stereo earbud, with a clip to hold it in place, is what should be used to hear the click and the track in one ear, and the live band in the other. Wireless is preferred because it offers the greatest freedom of movement.

The headphones or earbuds are plugged into a small box called an audio interface that is, in turn, connected to a laptop computer and an audio mixer. The audio interface routes one set of tracks to the stage and to the house, while routing the other with the click to the earbud to the conductor. Almost any 4-channel I/O (in/out) interface will work.

Using a simple multitrack digital audio application such as Audacity or Garage Band, allows the audio track with the click to be loaded into one stereo channel

Paper-playing techniques and the electronic track in PAPER CUT.

solely for the conductor. The track without the click is loaded into two more stereo channels: one pair routed to the stage (and podium) monitors so that the band and conductor can hear the track, and another pair routed to the house speakers for the audience. Many audio tracks use panning effects, so it's important that everything is routed to the audience in stereo.

An additional stereo channel may be used to route an optional pair of stereo microphones placed over the band. If the band is mic'ed, it's best to have an engineer reading a music score to ride the faders at the mixing board and control the balance.

As with all music, there's going to be a vast difference between the acoustics in a band rehearsal room, and those of the hall where the concert will take place. It's wise to mentally prepare for this during rehearsal, because this difference will be magnified when presenting a piece that includes an audio track. Balances (is the band, or the track, too overpowering?), and basic equalization (is there too much low-end, or any distortion, coming over the speakers?), will always require some attention. Every room and hall is different, whether it is empty or full of clothed, sound-absorbent people! A venue filled with naked people will of course be more resonant, without all the fabric to absorb sound.

we add the presence of integrated music coming through the house speakers that is meant to blend seamlessly with the band, a musician's listening skill is challenged even further.

Even with stage monitors pointed toward the band that play the track for them as they perform, there's really no perfect way for musicians to fully sense the complete effect of band and track as heard by their audience. Musicians need to be encouraged to have faith in an end result that they won't be able to hear – or see, in the case of music that has visual elements, such as my piece, PAPER CUT, which uses printer paper as a percussively sonic and multimedia element.

A little bit of psychology goes into building this trust, and one of the best examples I can think to use when rehearsing with a band, is to compare the electroacoustic music process to what's called the "green-screen" effect in Hollywood. Everyone has seen it: actors are filmed in front of – you guessed it – nothing more than a very plain bright green (sometimes blue) backdrop, and perform as though they are in a far more elaborate setting. That setting, however, will be assembled much later, using additional layers of footage or graphics. The end result will be seen by movie-goers as though it was all shot at the

same time. In this instance, the musicians are the actors. They have to use their imagination to think about what the combined sound of their work and the track will eventually be in the hall, even though they can't hear it themselves on stage.

I enjoy giving musicians an extended way to perceive their role as performers. I want to expand students' relationship to the music on their stands, and to the human beings who sit in the auditorium in front of them. We have become a highly multimedia, interdisciplinary society. Those of us on a stage should be aware of the entire impact of our performance, sonically and visually. We are now performing for audiences more familiar with staring at something that moves, rather than at something that merely makes sound.

YouTube is currently the most popular delivery platform for music, and the internet has become an organic, nearly invisible aspect of our daily lives. In the next issue of WASBE World, look for Part Two of this series in which I delve deeply into the fantastic new e-frontier of multimedia, social networks, and how our lives as music-makers are expanding far beyond anything we might have imagined only a few years ago.

Offering online resources

Composers can be helpful by offering a technical setup guide along with the track downloads. This will make it easier for the band director to set up things for rehearsal. Because composers have multimedia websites, it's easy for them to also offer score-specific resources for streaming or downloading audio, video, and additional curricula, including: score samples, articles, interviews, tracks for download (especially for students, so they can practice at home!), links to program notes, performance notes, rehearsal techniques, errata (fantastically helpful for conductors!), additional technical info, how-tos, software links, explanatory videos, an mp3 of the full piece, and – or course – information about how to obtain the music!

Building trust, broadening ears

One of the skills ensemble musicians develop as they become familiar with performing, is the ability to adjust for their surroundings. The sound they hear from their specific locale on the stage translates differently when the entire ensemble is heard from a seat in an auditorium. When

Called "one of the most noteworthy composers for the 21st century wind band" by Carthage College and Dr. James Ripley upon the premiere of her 2014 electroacoustic symphonic wind band piece LIQUID COMPASS, Alex Shapiro has emerged as a pioneer of inventive approaches that use new media to create music and meaningful relationships among colleagues. Drawing from a wide musical palette that defies genre, Shapiro's acoustic and electroacoustic works, published by Activist Music, are performed and broadcast daily across the U.S. and internationally and can be found on over twenty commercially released recordings from around the world. In 2011, the national music fraternity Mu Phi Epsilon presented Ms. Shapiro its highest distinction, the Award of Merit, for her innovative use of new technologies in composing and for her efforts in encouraging her colleagues.

Alex is the author of a chapter titled, *Releasing a Student's Inner Composer* for the 2013 GIA Publications book, *Musicianship: Composing in Band and Orchestra,* and two of her groundbreaking electroacoustic wind band pieces for high school musicians, PAPER CUT, and TIGHT SQUEEZE, will be featured in *Teaching Music Through Performance in Band, Volume 10,* edited by Eugene Migliaro Corporon and released by GIA Publications December 2014. Ms. Shapiro has presented workshops on electroacoustic music and social media at both the 2013 Midwest Clinic in Chicago, and the 2014 Texas Music Educators Association in San Antonio. Shapiro's music, as well as her award-winning nature photography, can be enjoyed on her blog, www.notesfromthekelp.com and on her website, www.alexshapiro.org.

photo: Paul Chepikian