

INSTITUTE OF CURRENT WORLD AFFAIRS

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Time (In and out of Japan)

28 Uguisudani-machi
Shibuya-ku, Tokyo

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Mr. R. H. Nolte
Institute of Current World Affairs
366 Madison Avenue
New York, N.Y.

Dear Dick:

In thinking back, recently, over the Japanese experience we have collected, I was surprised at what a prominent place time held. From the standpoint of my compositional work, I noticed retrospectively, I became markedly more interested in the temporal dimension of music beginning just after our first visit here in 1966. During our first year in Tokyo, this preoccupation must have continued below the surface because in the Fall I found myself spending the better part of two months reading and thinking about the psychology of time. On the practical level, the most surprising aspect of these informal studies was the discovery of how little has been published on the subject and how much of what does exist is based on work that is thirty years old or more. My particular interest was in combining sound and time, in better understanding their effects on each other. One would think that time would have the same fascination and fundamental significance for the musician as space has for the architect, sculptor, and painter, but, in the West, musicians have taken it pretty much for granted.

They talk around the subject, of course (The expressions are revealing: "to keep good time," "to be in time."), but they are actually referring to a kind of clock function, and not to a broad range of experience. Tempo in music has traditionally depended on a succession of more or less evenly spaced pulses. When these pulses are arranged into repeated groups by stressing every second, third, or fourth one (making it longer, louder, lower, higher,...), the result is called meter. But tempo, meter, and rhythm all depend on a regular clock-like reference and do not actually involve a great variety of temporal experience per se. At the low end, tempo is limited by breath capacity, and at the high end by the performer's dexterity or mental quickness. Even within the concept of tempo - involving a mutual awareness between performer and listener of a fixed reference - it is clear that the limits of our perception as listeners do not correspond to the physical limitations of our bodies as performers. Contemporary composers have become interested, however, in a much wider exploration of time than can be contained within even an expanded view of tempo.

Frequently, now, the intervals between events in music are judged very objectively by actual clocks (stop-watches), and are deliberately made irregular or greatly extended. Alternatively, one sometimes leaves the "timing" of events to chance, expecting, thereby, an irregular succession. Of course, by abandoning the reference pulse, the composer gives up all the normal excitement of anticipation, friction, and tensions arising from the interplay of stable and varying elements. He also destroys the possibility of ensemble playing - the capability of several musicians or an orchestra to start, move, and stop together. What he hopes to gain in part is a more direct and diverse temporal experience.

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As to why my awareness of time developed so strongly in Japan, I can only speculate. Superficially, one encounters the practical effects of oriental vs occidental concepts of time in dozens of ordinary situations. In spite of the fabled dynamicism of the Japanese people and its tangible results in economic terms, one of the first things a Westerner will notice in trying to carry on a daily life - in contrast with the tourist who sees, if at all, with a detached eye - is the general unconcern about time. If this is so marked in Tokyo, one can assume that it is even more pronounced in the country as a whole. At first, one imagines that the discrepancies are simply a result of superficial differences in values. In fact they are profound.

Each purchase at a Japanese department store follows the same general pattern. Large sales counters are situated in each department, and these are equipped, it would seem, with enough clerks to handle anything short of a stampede. They appear busy, which is to say they are never still, and yet there are normally several customers unattended. One may wonder what is the business of all the busy clerks, and at least part of the answer comes when his purchase is accepted for processing. Wrapping is, by our standards, incredibly elaborate and time consuming. It is not unusual to wait as much as fifteen or twenty minutes while the prescribed wrapping process is completed, involving individual paper for each item - in a veritable orgy of origami ("folding paper"), the forming of the overall parcel, its trussing up with plastic covered ribbon, attaching a plastic handle, affixing the store's individual stamp, and finally applying over it a red-inked seal. All appeals to forego this procedure are in vain. Even making allowance for the high cultural value attached to elaborate packaging of all kinds in Japan (people and houses as well as purchases), one imagines that a busy shopper's schedule might take precedence. It does not. The time necessary to get four items, which might otherwise take one hour, is in effect doubled.

It is not, apparently, a question of patience so much as a lack of concern about the passage of time. Western writers habitually refer to oriental "patience," but this word carries, in a sense, an admonition to control oneself. It puts responsibility, the judgment, on the person, suggesting that he is expected to control himself but more particularly that the situation doesn't merit loss of control. The corresponding Japanese words, gaman and nintai, carry a strong sense of "bearing" or "enduring" in spite of the weight of the problem. More appropriate as an explanation of the oriental way is the idea of an habitual, automatic resignation in the face of events. Resignation is a basic aspect of Buddhism and is deeply ingrained in the oriental character. In the case of time, they are automatically conditioned to accept the flow of natural conditions, so that no conscious process of control, no patience in our sense is involved.

Though Japanese musicians are not yet unionized, their busy schedules would seem to require careful budgeting of time. In our CROSS TALK concerts, we have used first-rank professional performers. They arrive on time for a scheduled two-hour rehearsal but frequently seem in no particular hurry to begin. During the course of the rehearsal there may be frequent stops for discussion of points as well as laughter but when the scheduled time is up, no one moves to go. The rehearsal continues at whatever length seems reasonably necessary. Though attractive on the surface, this state of affairs is not comfortable for the Westerner, with his built-in concept of urgency, to accept; and I suspect that it is partly to blame for the lack of polished performances here.

Because of the elaborate structure of traditional courtesies here, one must revise his views about the importance, length, and number of meetings necessary to reach agreement on a project or request. If matters are to go smoothly, a telephone call will simply not do. A personal visit is required, preferably in company with a mutual friend or spokesman. Such an encounter, while going nowhere to the Western eye, may continue for several hours. Other meetings follow, gradually involving other persons and zeroing-in on the desired goal. Perhaps the seemingly large expenditure of time is another result of "going with" a natural process rather than trying to force it to conform to one's immediate needs.

I mention the above practical matters superficially, only as indications of what might have put time in my mind. By Western standards, the high level of activity in Japan does not correspond to an equally high level of apparent result. There is quite clearly a different outlook on goals, and this presents to the Western mind the appearance of a chaotic mixture of efficiency and inefficiency, practicality and impracticality. Some clarification can be gained from the structure of the Japanese language, again.

While Western languages place the speaker or writer in the midst of a sectionalized chronology (in a sense, rather

like the musical concept of tempo mentioned above), Japanese does not. While we think of past, present, and future, and discuss relative position in time (that is to say the position of an event on a scale of time measurement extending from the past, through the present, and into the future), Japanese is restricted formally to two aspects: perfective and imperfective. There is no equivalent to our future tense. Actions, events, thoughts, and so on, are either completed (perfective) or not yet completed (imperfective). About the imperfective, there is no ambiguity, but an imperfective process may be going on now and not yet be complete, or, on the other hand, it may not yet have even begun. There are ways in which these things can be clarified to some degree, of course, but these are additions to the primary organization into aspects.

In Western languages, a tripartite division - past, present, future - structures all experience into one stream with ourselves, "now," at a center. Everything can be referred to the same structure of time measurements. Just as we in English are aware of the perfective-imperfective frame of reference, the Japanese speaking person is aware of the past-present-future system. The contrasts arise from the fact that in each language a different organization is primary. In Japanese, one's "position" in time is different, in a way, for each element of his life, depending on the natural division into aspects, perfective and imperfective. His sense of time is, therefore, relatively, more vague particularly with respect to imperfective situations.

North Americans and Europeans have strong ideas about time. For us it is a "commodity" which can be owned, bought, borrowed, stolen, and wasted - not just figuratively. But in Japanese, one cannot say anything directly corresponding to "my time," and the activity of work seems to have an inherent value rather than being a means toward "conserving" or making "use" of "one's time."

Traditional Japanese arts, particularly the Noh drama, also present a strikingly different temporal experience to the Westerner. In its broadly spaced time intervals and apparently sudden, violent events, it seems very "contemporary." But the spaces in time and the pacing of events are in no sense casual or unprepared. There is an almost superhuman personal force applied to channeling and restricting the content of feelings, to resisting untoward change and caprice through mental and physical discipline. This is out of keeping with the generally more permissive and relaxed atmosphere in the Western contemporary art that is most frequently - and erroneously - compared with Japanese models. It was, incidentally, widely reported in Japanese newspapers that London critics were totally unprepared for the experience of Noh when a prominent Japanese troupe visited there last year. Many of them apparently found the whole rather dull and missed completely the exhaustingly dynamic undercurrents that by no means

depend on language (the actor's manner of intoning, in fact, makes the meaning incomprehensible even to many Japanese ears).

Below, I have excerpted the more general sections from an article I have written, IT(')S TIME, and added reflections and elaborations occasionally. The materials come from a number of sources a few of which are listed at the end. All have been filtered and redirected towards the end of broadening the understanding of time as related to musical perception. I hope that I have introduced no more than a minimum of distortion, but would welcome comments.

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A perception, as distinct from a memory or an expectation, is an experience that seems totally in the present (No part of it seems "past" before the whole is finished.). Its duration is normally 2 or 3 seconds, but in the case of small groups of stimuli it may extend to as much as 5 seconds, including, perhaps, 25 - 30 items. The most accurate estimation of time intervals themselves occurs at about 0.75 seconds, though, generally, short intervals are overestimated and long intervals underestimated. When one deals with numbers of minutes instead of seconds, errors become very large. The actual experience of time, then, is direct and accurate only in the very short term. Subjective judgments about it are affected by so many factors that generalizations can, at this time, do no more than indicate tendencies.

For example: is the duration to be judged filled (a continuous sound or a homogeneous collection of sounds) or empty (its extremes marked by solitary impulses); is the judgment made by verbal report, by reproduction (where the listener activates what he believes to be an identical interval), or comparison (signal A is or is not equal to signal B); if the interval is empty, are the limits marked by events in the same sense modality (two sounds) or by different ones (one visual and one aural) (Signs from different sense modalities are difficult to integrate for judgment.); is the signal heard against a background of noise and reproduced against a background of silence, or vice versa? All the above influences are further complicated by the effects of set (formed by the listener's experience, expectations, etc.) and by the voluntary or involuntary exercise of attention (If two signals arrive at the brain simultaneously, the one which is attended to will appear to precede the other.). Short-term memory also plays an important part in our experience of time. But memories are vivid and accurate in direct relation to when (how soon) and in what order they are called upon.

Large-scale periods can only be judged by referring to some internal or external chronometer. Heartbeat and breath rate can give clues but they are at best unreliable, varying according to one's state of health and emotional agitation. But even when we determine relationships between periods of time by means of some "clock," the objective knowledge probably will not coincide with our experience of the time duration

involved. In fact some psychologists have suggested that the awareness of time arises only from dissatisfaction with one's situation. If so, it is all the more clear why the oriental capacity for resignation should insulate them from a keen sense of time in its small dimensions. They are conditioned to go with their environment rather than to combat it. No wonder that the Westerner's experience and evaluation of temporal experience is so different.

Biological systems respond primarily to change. The ear quickly detects any change in auditory stimulation (including cessations) and routinely ignores the sameness of monotonous signals. Depending on conditioning and values, one's judgment of what is monotonous will vary widely of course. During experiments with a totally uniform visual field, a third of the subjects experienced a completed cessation of visual experience: not a "blackout," but a void, an absence. The experimenter conjectured that perceptual mechanisms have evolved to cope with a differentiated field, and when they meet with uniformity there may be a temporary breakdown.

Another instance of the remarkable way in which receptors respond to extreme situations emerged from studies on visual fatigue. By attaching frames containing basic geometric figures directly to the surface of the eye, it is possible to study the effects of visual fixation. As expected, figures tend to fade after prolonged observation when the eye is unable to scan, and thereby to engage new receptor cells. Of particular interest was the fact that portions of the visual figures fade in a precise and orderly manner, so that what remains is still definite, and usually a strong formal configuration. There was no immediate explanation as to why the fading should be complete and selective rather than involving blurs and capricious areas of the figures.

The mechanism of the ear is sensitive to intensity, frequency, and time, and is susceptible to several varieties of fatigue. It would be interesting to know in what way aural sensations vary with prolonged exposure, and whether one experiences orderly sorts of fading - fadings which remove complete segments of the total sensation, leaving partial but independently sufficient impressions.

Change is especially important in auditory experience. Adults who lose their hearing relatively late in life complain not only of the lack of communication but that life seems to have lost its "ongoing" character. Experiment has illuminated this by showing that psychological time runs at quite different rates during noise than it does in relative silence. The comparatively high level of stimulation during noise apparently speeds the flow of subjective time, and the subjective reproduction in silence of a duration heard in noise will be considerably longer, objectively, than the original. This effect,

produced by experimenters with white noise, would certainly change if a patterned sound were used, but auditory background apparently acts in some way as a calibrating monitor for our internal clocks. It might be interesting to correlate information on sound level in rural vs urban, residential vs industrial regions with regard to its possible influence on both levels of activity and productivity. Noise pollution is certain to become a growing concern psychologically as well as physically, and not alone with regard to our own megapolises. Emerging industrialization cannot fail to raise these questions in countries even less ready to cope with their effects. The same kind of influence, incidentally, can be attributed to temperature. Time runs subjectively faster at higher body temperatures, as, for example, during illness. This is not so interesting an area since body temperature is relatively independent of climate (locale).

Even when the factors already mentioned are kept relatively constant, there is marked variation in the values for various thresholds (what level of sound is just audible, what is painfully loud, how long must a sound be to be heard as having a duration, etc.) from person to person and within the performance of individuals from day to day, hour to hour, and even within the span of a few seconds. If a group of five identical sounds with a loudness level close to the threshold of audibility is repeated several times in quick succession (taking, in all, 5 seconds), one may hear all, or some, or none at each trial. Tones of high frequency will tend to become subjectively softer as their duration extends, and may even disappear in time. Generally, it is necessary to constantly increase the power of a sound in order to maintain a uniform subjective loudness. These facts are relevant since our temporal judgments and the nature of our experiences with time are based to a large degree on the number and spacing of the events which demarcate or populate an interval. Of two objectively equal durations, the one which provides, in retrospect, the larger number of memories will seem longer. If we miss some events, our impressions are necessarily altered.

Sensations of time are guided by the tensions of anticipated change: the ending, alteration, or beginning of phenomena. In music there is usually a fabric of multiple strands or related events, but the ways in which their relationships are measured may not coincide. When one system of parameters is accepted, others may become difficult to integrate or even irrational. For example, in normal situations we can perceive pitch and loudness changes with one ear while sitting motionless. If we are required to take account of left to right antiphonies, apparent or actual movement of sounds, we must use both ears, still remaining motionless. But if the patterns of spatial movement require us to identify up and down as well as shifts to left and right, we must be free to move, to change the orientation of our ears with respect to the environment. These phenomena are due to amplitude and phase differences (at high and low frequencies, respectively) resulting from the slightly different distance from the source to the right and to the left ear.

The set of a listener about to hear a piece of music - the momentary collection of his relevant experiences, capacities,

expectations, physical conditions, and so on - may be the overriding factor in his response, yet there is rarely more than casual attention paid to it. Traditional rituals of dress, place, and decorum evolved because of the desirability of a common context (the concert situation), but we rarely consider how complex the effects of individual variations in set are, and almost never make attempts to influence it. Again, this area has an obvious and high level of influence sociologically, and not only with regard to time, as PR men the world over well recognize. It is difficult enough to make predictions about the "sets" of individuals with one's own cultural background - generalization can be particularly dangerous in matters of taste and values - but to presume to do so across cultural boundaries so decisive as those between West and East invites disastrous results. One can easily become defensive or righteous about his individual values without realizing how restrictive, how irrelevant they may be when applied to an international arena.

If an observer is presented briefly with an incongruity - a combination of events which his experience contradicts - experiments have shown that there are four categories of response influenced by set: dominance, when clashing characteristics are altered so as to fit with one which is dominant, and accurately reported; compromise, when none of the objective facts is correctly retained, but all are altered to achieve an acceptable concurrence; disruption, when the subject simply rejects all facts and cannot report what happened at all; or recognition, where, in spite of the briefness of exposure, the objective facts are perceived and the subject reports a new (and for him unprecedented) event. These same conditions may well apply to aural experience.

One might attempt to influence set directly, supplying information about the duration of a musical composition before it begins, marking the moments at which particular attentiveness is required, and so on. This seems a little crude, though there can be no doubt that acuity is much improved when one knows when a change (an event) will probably occur. Our extraordinary sensitivity to nuance in the performance of traditional music is due to the foreknowledge that massive familiarity provides. In the same way, the Westerner's lack of sensitivity to and knowledge of the intricacies of Noh, kendo, sumo, etc., makes sudden and stunning what is natural and expected for the initiate. Other approaches such as lighting, disposition of seats, relative location of listeners and sound sources have been tried tentatively, but little systematic information about their effects has been collected. Some "happeners" have tried intimidation, but even the sympathetic observer rejects overt manipulation. It's a delicate area, no doubt, but well worth additional thought, for mental disposition not only alters the color of experience but can actually determine which objective facts we perceive and which we do not.

There is still disagreement among physiologists as to whether attentiveness increases the intensity of a perception or enhances the short-term memory of it, but the effects are sometimes decisive, even in the most basic situation. As noted above, if two signals reach the brain simultaneously (and this is not the same as saying that they occurred simultaneously in objective time), the one which is attended to - either consciously or unconsciously - will be perceived as occurring first. Similarly, the more intense of two objectively simultaneous impulses will appear to take place earlier. This is part of the mechanism of apparent motion, whereby the brain interprets several stationary stimulus points (either aural, visual, or tactile) as a single moving stimulus.

If one attends to a train of signals, its elements are retained in the brain for approximately 5-6 seconds, while elements of an unattended series remain for only 1-2 seconds. Since we cannot concentrate on more than one sequence at a time, there are definite limits to the sorts of multiple sequences that can be "comprehended" simultaneously even in the best of circumstances. There is, in addition, an increment of time (1/6th of a second) taken by each shift in attention. This means that very rapid alterations in auditory attentiveness are not only fatiguing, but make the material literally "unintelligible." Yet some forms of attentiveness require no conscious effort, and when motivation is high, one can perform remarkable feats of perception. Talking at a party, in the midst of a dozen other conversations of varying speeds and intensities, the noise of dishes, background music, traffic, and so on, one can catch the sound of his own name from across the room.

The factors cited above are only a small fraction of what is involved in shaping our individual experience of time, but they should be sufficient to make one thing clear. The tendency to seek absolute information on auditory or perceptive capacities, and to achieve foolproof (controllable) performance conditions - even with the aid of computers - is unrealistic at this time. Even assuming a uniform, high level of motivation for all listeners, what is physically possible for one will not be for another. Increasing precision in the control of traditionally oriented musical stimuli (more or less ideal, unchanging sound objects projected at the listener from one direction) does not imply a complimentary increase in control over the listener's response. The composer's range of concerns should be enlarged. There are many perceptual capacities to be explored, and from my own standpoint, interest in notational procedures and performer group-dynamics remains secondary to the importance of changing and enlarging the repertoire of responses - through far more complete knowledge of how they come about. The way in which a sound is made is, in the end, incidental to how it sounds to the individual listener.

The generalizing of this line of reasoning to other applications should be an easy matter. Studies of the effects produced on behavior by the crossing of time zones are one example. By making us aware of how profoundly different from our expectations familiar looking things can be (modern Tokyo, e.g.), our Japanese experience has made us wary indeed.

Sincerely yours,



Roger Reynolds

Bibliography:

- Experiments in Visual Perception, edited M.D. Vernon,
Middlesex, Penguin Books, 1966
- Handbook of Experimental Psychology, edited S.S. Stevens,
New York, Wiley and Sons, 1951
- Information Theory and Esthetic Perception, A. Moles
(translation J. Cohen), Urbana, Univ. of Ill. Press, 1966
- Music, Sound and Sensation, F. Winckel (translation T. Binkley),
New York, Dover Books, 1967
- The Psychology of Time, Paul Fraisse (translation J. Leith),
London, Eyre & Spottiswoode, 1964
- Waves and the Ear, W.A. Van Bergeijk, J.R. Pierce, E.E. David, Jr.,
Garden City, Doubleday, Anchor Books, 1960
- Numerous individual studies from periodicals and unpublished reports were also used.

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