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ABSTRACT

In attempting to define the "ecology" of human development, the term's history and connotations are discussed. The ecological approach requires that the person, the environment, and the relations between them be conceptualized in terms of systems, and subsystems within systems. The experimental situation is not limited to being unidirectional and dyadic, allowing only first-order effects. Two or more environmental settings can and should be included, and these environments should be studied and described along with the subject. An ecology of human development must be concerned not only with the developing child, but also with the developing ecology; that is, changes both in the micro- and macrostructures which envelop the child and those in his immediate environment. Finally, the author urges a reversal of usual experimental procedure, beginning the experiment by trying to change one of the environmental elements in order to get some idea of the delicate balance between the developing organism and its surroundings. (Author/BW)

The Ecology of Human Development in Retrospect and Prospect[1]

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I. Prologue

It is now more than twenty years since Barker and Wright (1954) introduced the word "ecology" into the vocabulary of researchers in human development. And for many investigators for many years, that is all that it was, a word they knew referring to somebody else's work, usually Barker's, Wright's, or one of their student's, that bore little or no relation to their own activities. To borrow an apt term employed by Barker and Wright's mentor and theoretical forebear, Kurt Lewin (1935), so far as establishment behavioral science was concerned, ecology was a "system in abscission," cut off from the main body of scholarly endeavor.

Over the past few years, however, there has been a perceptible change both in the status and substance of ecology as an approach to the study of human development. The change is reflected in the very fact and nature of this conference. As we were informed in the opening session, the organizers had expected about a hundred people to attend, perhaps from a dozen countries. The number of registrants, and what is more significant, the number of submitted papers, turned out to be several times that number, with over 500 persons from 27 countries participating in the four-day meeting, including many of

[1] Invited address at the final plenary session of the Conference on Ecological Factors in Human Development held by the International Society for the Study of Behavioral Development, University of Surrey, Guildford, England, July 13-17, 1975.

the leading researchers in the field of human development. Most noteworthy of all, in contrast to other meetings we have all attended, while the sessions were on, there were more people in the meeting rooms than out, and much of the talk between sessions was about data, theory, and plans for future research. Clearly, the ecology of human development is an idea whose time has come.

What is the idea, and what has it come to? As I have already intimated, while rooted in the theoretical conceptions of Kurt Lewin and influenced by the pioneering work of Barker, Wright, and their students, the ecology of human development has itself developed so that it now goes well beyond and, indeed, in some respects contradicts convictions of some of its originators. I find myself in a unique, though unenviable, position to assess its present character, scope, and direction, for it has fallen to my lot to deliver the final address summarizing the work of our Conference. I resolved to take my assignment seriously. What I would do, I decided, rather naively it turned out, was not to prejudice the issue with an a priori conception of what was meant by the term ecology. Rather, in our best behaviorist tradition, I would work from an operational definition; namely, the ecology of human development encompasses those activities that were engaged in by the participants in a conference specifically addressed to that topic; namely, this one.

But as so often happens with operational definitions, I found myself caught up in problems of circularity and lack of correspondence between the operations that met my definition and the preconceptions

that I had sought to set aside but which kept intruding into my consciousness. So what I shall be presenting is less a review of our proceedings, which could only be fragmentary at best, than a summary of my efforts to cope intellectually with the dissonance produced by the experience we have been having for the past three and one-half days.

My first imbalance stems from a similarity rather than a contrast. A few months ago I attended the biennial meeting of the Society for Research in Child Development in the United States. With one possible exception, the subject matter of the papers presented at that meeting was much the same as at this conference. There, too, one heard, from time to time, talk of ecological models, to which I contributed more than my share. But most of the actual research was on mother-child interaction, with a few brave souls on the ecological frontier going so far as to replace the mother by the father. To be sure, here at our meetings, there have been fewer laboratory studies, and more research on real-life environments. But there is not much scientific solace to be gained from this modest contrast, for, in our opening session, our Program Chairman Professor Ambrose warned us against the danger of mistaking the study of environmental influences on human development for the ecology thereof. And, in one of our symposia, I found myself publicly resisting the proposal of one of our members to excommunicate laboratory experiments on the ground that they necessarily violated the new orthodoxy of ecological validity.

II. Issues of Ecological Validity

The invocation of this new scientific shibboleth highlights the central question before us. Wherein lie the defining characteristics of this new domain of the ecology of human development? How does it differ in its theory, substance, or method from developmental psychology in general, and from the study of environmental influences in particular? To put the issue in its most challenging form, does the ecological approach offer anything that is new and promising for the scientific understanding of the process through which we evolve as human beings? These are the questions I should like to explore with you, in retrospect and prospect.

Significant progress in any science appears to occur through advances of one of several types. The first is the development of a new technology. Perhaps the most influential example in our field is one that we now view with mixed feelings: the intelligence test. A second type of breakthrough, often linked to the first, is the discovery of new substantive knowledge, as in the identification of chromosomal anomalies affecting development, an advance made possible by Levan and Tjio's invention of a more accurate technique for karyotyping. A third source of scientific stimulation is what I shall call propositional theory; that is, a conceptual system that generates statements of necessary or probable relations between observed phenomena. I suspect the example par excellence in psychology is one that will not arouse much enthusiasm: Hull's logico-deductive theory of learning. Requiescat in pace!

Finally, there is another kind of theory building, one that does not necessarily or directly give rise to testable propositions, but rather opens up new, previously unrecognized realms of inquiry. Pure examples of this sort of theoretical development are hard to come by in our own field. Perhaps Freudian theory comes closest, and there are those who view Piaget's most important contributions as being of this kind.

If the ecological approach is to qualify as a scientific advance, of what sort is it? With respect to method, it can hardly claim originality for its principal tool, naturalistic observation, since this technique has earlier and deeper roots in the related discipline of ethology. Indeed, some pixie spirit among us quipped the other day that ecology was invented to enable developmental psychologists to do naturalistic observation without knowing anything about the organism. If so, it is only fair to acknowledge that we have considerably improved the procedure since we took it over. Still, the ecology of human development can hardly justify its raison d'être, and would not wish to, primarily on methodological grounds. Nor can it claim, as yet, to have made any critical substantive discovery. And certainly it has not generated a propositional theory. It would appear that whatever scientific promise the ecological approach may have lies in its capacity to reveal new and fruitful domains of scientific inquiry. Let us scan the horizon for what these new territories might be.

A guide to our search is provided by what Professor Ambrose designated, in his opening address to the ecology conference, as a distinguishing characteristic of the ecological approach: its capacity to generate findings of direct relevance to social policy. While I agree with the attribution, I give it a somewhat unorthodox interpretation. Thus I view it as justifying not the usual, self-serving claim that social policy needs our science, but the contrary and perhaps unsettling thesis that our science needs social policy.

I have elsewhere developed this argument in some detail (Bronfenbrenner, 1974a, 1974b, 1975a). Since it is basic to my expedition, I shall review the main points briefly here, and ask the indulgence of those who may have heard them before. At the very least, I can promise you some new and fancy variations on the familiar theme.

A few years ago I was made aware of serious limitations in the research models we employ in the study of human development. As so often happens, my conviction of inadequacies elsewhere was a projection of my own. I was repeatedly finding myself unable to answer questions put to me as an "expert witness" by policy makers both in the public and private sector. Here are some of their queries:

1. How important is it for a child to be with its mother during the first three years of life?
2. Can fathers care for young children as effectively as mothers?
3. Does it make any difference if young children are placed in day care for half the day versus the full day?

4. Should parents be allowed to bring children to work?

5. How important would it be for our company to adopt a policy of enabling parents to be at home when the child returns from school?

6. What changes should be carried out in our schools to reduce rapidly rising rates of drop-outs, drug addiction, and vandalism?

(and my favorite)

7. How can TV commercials be designed to foster the development of children and family life?

It will come as no surprise to you that I was not able to find answers to such questions in our scientific publications. After all, you may say, there is no reason to expect answers to be found there, for such matters are the proper concern of policy makers, not of scientists. If so, the issue is joined, for I contend that the consideration of social policy questions is <u>essential</u> if our field is to achieve theoretical maturity, methodological rigor, and -- our ultimate goal -- the comprehensive, systematic understanding of the nature and scope of developmental processes <u>in context</u>. For what is implied in these policy questions is a concept of the environment that is radically different from the one that has typically been employed in our scientific investigations. Let me mention but a few of the sharpest contrasts.

1. Questions of public policy focus attention on the enduring, and thereby familiar social contexts in which the child lives (or might live if public policies were altered), and in which the participants occupy enduring, and thereby familiar, roles, and engage in

activities that have social meaning in that setting. Such an orientation differs from many, but I hasten to add not all, research settings in which the situation is ephemeral and unfamiliar, the task is not only unfamiliar but artificial (in the sense that its social significance is, at best, unclear), and the other participants are limited to a single child with a single adult who is a stranger (typically a graduate student).

Indeed, it can be said, and I have said it, that much of American developmental psychology is the science of the strange behavior of a child in a strange situation with a strange adult.

2. The fact that the strange situation is ephemeral, by which I mean that it is short-lived and seldom, if ever, occurs again, imposes severe yet, paradoxically, rarely acknoweldged limitations for the study of development. After all, development implies some kind of progressive change over time. If our assessment takes place at only one point in time, as is often the case, we can hardly expect to learn very much about development, unless, of course, we are content to confine ourselves to those growth changes that can occur within the space of a few minutes without regard to their durability beyond the experimental situation. And even if we were to repeat the assessment at a later date, it is unlikely that we would observe any sequellae of an experience that lasted for only a few moments in the first instance.

At this point, you may justly complain that the foregoing criticisms are relevant only, or at least mainly, to laboratory studies. Moreover, there is little here that is new.

Criticisms along these lines have appeared in the published literature, and are all included under a general criterion already being employed in social research and referred to as ecological validity.

Ecological validity does call into question some, though not all, laboratory research, but it clearly gives a clean bill of health to the many and manifold investigations that psychologists have conducted in real-life situations over extended periods of time. Does this make them ecological? If so, what else is new?

This brings us to the heart of the matter. If the ecology of human development has any scientific contribution to make, it must go beyond the caveat of ecological validity, which all too often is little more than a cavil.

III. Beyond Ecological Validity

The issue is indeed not simply one of where and with whom the investigation is carried out; it is a matter of the underlying conceptual model of the environment, its structure, the place of the developing person within this structure, and the possible relations and processes that are allowed for between the elements of the model. What I am referring to is yet another distinguishing characteristic of the ecological approach, namely the requirement that the person, the environment, and the relations between them be conceptualized in terms of systems, and subsystems within systems. What does this mean? A revealing way to answer the question is to compare our conventional research model with the new ecological one, not with respect to content as we have been doing, but in terms of formal properties. I shall begin

with a now familiar contrast which you will all recognize and applaud.

1. In the classical psychological research model, whether in the laboratory or in the field, there were always two parties -- an experimenter, identified solely, and apparently still acceptably, as E; and, another person, with us usually a child, equally informatively identified as S -- the subject. The term subject is very apt, for it reflects the fact that, with a few exceptions, the process operating between E and S was viewed as unidirectional; the experimenter presents the stimulus, and the subject gives the response. Nowadays, as good ecologists, we all know that the process goes both ways. This point has special significance when applied to studies of human development; it means that we should look not only for the influence of the parent on the development of the child, but also for the effect of the child on the development of the parent. I suspect that among the most significant psychological changes that take place in adulthood are those that occur as a function of the behavior and development of our children. Here, then, is our first new domain unlocked by the ecological key -- not very big, I admit, perhaps no larger than the upstairs bedroom, but, as we all know, a lot can go on there.

2. Our second contrast has more generality. As we have already seen, the classical research model is typically limited to a two-person system. Even when more than two people are involved, the behavior of each is usually analyzed separately, and interpreted as an independent effect. For example, in the current wave of research on father-child

interaction, the behavior of the father, and any reaction it may evoke from the child, are treated in traditional, Aristotelian, class-theoretical terms as pure paternal effects, without regard to the possibility that both the father's action and the child's response may be influenced by the mother. Three or N-person models are of course to be found in psychological and social theory (e.g., Parsons and Bales) but are rarely employed in practice. As a result, the usual paradigm allows only for what might be called first-order effects; that is, the influence of A on B, or B on A. There is neither interest in, nor even the possibility of examining, how the interaction of A and B might be affected by a third part C, such as the father, or a second child, a grandfather, or teacher. Here is still another as yet unexamined phenomenon revealed by an ecological approach. We shall refer to this phenomenon as a second-order effect. As we shall see, this effect reappears at successive levels of the system and, each time, opens up new vistas for research.

3. The expansion of research horizons made possible by going beyond a unidirectional, dyadic model limited to first-order effects becomes clearer when we remove yet another restriction that characterizes not only most of the paradigms we employ in developmental psychology but even those which are explicitly labeled as ecological. Such studies typically focus on and confine attention to behavior and development within a single setting only. Thus we usually carry out our ecological studies either in the home, or the playground, or the classroom, etc.,

but seldom in more than one context simultaneously. From a theoretical viewpoint, we may note here a continuity of the traditional research paradigm, now across domains; the restrictive two-person system at the level of the individual becomes an analogous person-in-single-context model at the level of settings. Once a second setting is introduced, the system becomes triadic and, accordingly, allows for the possibility of second-order effects. Such theoretical enrichment generates an array of new and provocative research questions. Not only does it necessarily introduce a comparative perspective, but it also calls attention to the importance of investigating joint effects and interactions between settings; for example, home and school, family and children's peer group, the peer group and the school, etc., and thereby highlights the possibility that events in one milieu may influence the child's behavior and development in another. As a case in point, it is not unlikely that the experience of a child in day care, in the classroom, or the informal peer group, may change his pattern of activities and interaction with parents or siblings in the home, with consequent implications for the course of development.

4. But even when two or more environmental settings are included in a single research design, prevailing research models permit and encourage a primary if not exclusive focus on consequences for the child to the neglect of the characteristics of the environment that induced these consequences. Thus, over the past several decades, we have had studies beyond number on the behavior and development of children from

different social classes, societies, and subcultures. More recently the interest has shifted to outcomes in more concrete settings: the effects of father absence, the influence of family versus school on educational performance, or currently, the impact of day care versus home care on the child's development. In all these cases, however, the main emphasis is on analyzing the differential characteristics of the children, not of the settings in which they are found. As a result, interpretations of environmental effects are often couched in class-theoretical terms; that is, observed differences in children from one or another setting (e.g., lower class versus middle class, French versus American, Israeli kibbutz versus city, day care versus home care) are "explained" simply as attributes of the setting in question. And even when the environment is described, it is in terms of a static, self-contained structure of relations and values that makes no allowance for processes of interaction through which the behavior of participants in the system is instigated, sustained, and developed. These deficiencies disclose, by default, the defining core of an ecological approach to human development; namely, its focus upon the dynamic relations between the organism and its surround, with both the person and the environment engaged in reciprocal tensions and activities, and undergoing progressive changes over time.

It is only recently that investigators have begun to employ research models that allow not only for assessing the effects upon children of exposure to different kinds of settings but also for analyzing the structure and pattern of activity specific to each

setting as these affect and are affected by the developing child. A case in point is the on-going longitudinal study by Cochran (1975) of the development of Swedish children brought up in home versus center care. Before seeking to assess the effect of these settings on the child, Cochran conducted observations and interviews designed to describe the activities taking place in each, as well as similarities and differences in the nature of social interactions between children and adults, and of children with each other. Investigations of this type represent a significant advance over earlier studies that dealt mainly with differences in outcome measures, often in the form of scores on standardized tests.

5. But even when they are concerned with process-in-context as well as product, most contemporary researches still overlook the major dimensions of the ecological field. Again, issues of public policy can serve as our guide to the new terrain; thus we note that they address not only the immediate settings containing the child but also the larger systems that impinge upon and encompass them and may in fact determine what can or cannot occur in the immediate context. It is here that we have the possibility for second-order effects on a massive scale. Powerful forces affect the child's behavior and development not directly but through their impact on the immediate settings containing the child, especially his family. Such encompassing systems, which Orville Brim (1975) refers to as macro-environments, include the nature and requirements of the parents' work, characteristics of the neighborhood, transportation facilities, the relation between school

and community, the role of television (not only in its direct effect on the child but in its indirect influence on patterns of family and community life), and a host of other ecological circumstances and changes which determine with whom and how the child spends his time: for example, the fragmentation of the extended family, the separation of residential and business areas, the breakdown of social networks, the disappearance of neighborhoods, zoning ordinances, geographic and social mobility, growth of single-parent families, the abolition of the apprentice system, consolidated schools, commuting, the working mother, the delegation of child care to specialists and others outside the home, urban renewal, or the existence and character of an explicit national policy on children and families.

In sum, here are whole subcontinents for exploration revealed to us through our N-dimensional ecological lenses. Early expeditions to some of these new lands have already reported intriguing preliminary findings (Schoggen and Barker, 1975; Wright, 1975), but in my judgment, we are only at the beginning of a new age of discovery.

6. The foregoing examples also highlight the fact that an ecology of human development must be concerned not only with the developing child, but also with the developing ecology; that is, changes both in the micro- and macro-structures which envelop the child and those in his immediate environment. This domain of secular changes in human ecology represents the opposite and complementary side of the coin presented to us by Baltes and Nesselroade (1972) in their analysis of cohort effects. And the changes are just as dramatic. Let me illustrate a few of them from our own society -- the United States.

mothers working full time), the number of adults left in the home who might care for the child has been decreasing to a national average of two. Chief among the departing adults has been one of the parents, usually the father, so that today one out of every six children under 18 is living in a single-parent family. This is often not a temporary state, since, on a national scale, the remarriage rate, especially for women, is substantially lower than the rate of divorce in families involving children, and this differential has been increasing over time. A significant component in the growth of single-parent families has been a sharp rise in the number of unwed mothers; more young women are postponing the age of marriage, but some of them are having children nevertheless.

All of these changes are occurring more rapidly among younger families with younger children, and increase with the degree of economic deprivation and urbanization, reaching their maximum among low income families living in the central core of our largest cities. But the general trend applies to all strata of the society. Middle class

families, in cities, suburbia, and non-urban areas, are changing in similar ways. Specifically, in terms of such characteristics as the proportion of working mothers, the number of adults in the home, single-parent families, or children born out of wedlock, the middle class family of today increasingly resembles the low income family of the early 1960's.

Although levels of labor force participation, single-parenthood, and other related variables are substantially higher for Blacks than Whites, those families residing in similar economic and social settings show similar rates of change. The critical factor, therefore, is not race, but the conditions under which the family lives.

Concomitant with these changes in structure and position of the family are secular trends in indices reflecting the well-being and development of children. Youngsters growing up in low income families are at especially high risk of damage physically, intellectually, emotionally, and socially. There is also evidence for disturbing changes over time indicated by declining levels of academic performance and rising rates of infanticide, child suicide, school drop-outs, drug use, and juvenile delinquency.

While cross-sectional differences in the well-being of families and children are strongly linked with economic status, the longitudinal trends appear to be a function of more complex social changes associated with increasing urbanization. It is suggested that the destructive effect of these changes derives from the progressive segregation by age in American society, resulting in the isolation of children and those responsible for their care.

But of course concomitant secular trends are notoriously inadequate as evidence for cause and effect. You might therefore expect me now to argue for the importance of systematic studies on the consequences for the child of the profound ecological changes I have just documented for you. But this is not, in my view, the strategy of choice for ecological research. To be sure, it would be interesting to see whether the same trends are present in other societies. In this connection, I have been suggesting to colleagues abroad that they carry out similar analyses, and recently Professor Kurt Lüscher of the University of Konstanz has presented analogous results for the Federal Republic of Germany (Lüscher, 1975). There were both similarities and differences. For example, the proportion of working mothers also showed a marked increase over time, but there was no corresponding rise in the number of single-parent families or illegitimate births.

Professor Lüscher suggests an explanation for the cultural discrepancy in terms of the diverse demographic conditions previously prevailing in the two countries, such as the differential sex ratio in Germany produced by World War II. Without disagreeing, I emphasize a different and complementary hypothesis in terms of the greater availability of family support systems in German society. But we both agree that, at this stage, explanations are premature, but useful insofar as they can contribute to the development of a more adequate ecological model for systematic research. From this perspective, these secular trends point to two additional requirements for our scientific paradigm.

7. The ecological field is defined not only by its form, but also by its content. Specifically, undergirding both the encompassing social structure and its embedded immediate settings is an ideological system which, both explicitly and implicitly, endows motivational meaning to social networks, institutions, roles, activities, and their interrelations. Whether or not children have place and priority in such an ideology is of especial importance in determining how a particular system, including the entire society, treats its young and those responsible for their care.

The existence of an ideological substratum for every level of ecological substructure means that systems and subsystems similar in form can have quite different effects depending on their meaning to the persons who are the participants in the system. In terms of research method, this means that an adequate ecology of human development cannot be only behavioristic, rely solely on objective observation. We need also to undertake a phenomenology of human ecology, that is, an effort to understand what the particular ecological context -- be it micro or macro -- means to the persons in it. To state the point rather provocatively, I would argue that we need to study phenomenology not merely now and then, but in every single ecological study we undertake!

8. This brings me to a key point with respect to the requirements and potential rewards of ecological research. I have left it to last in the hope that anything which brings to an end so long an exposition would be pleasurable, and hence attractive. As you can see, I expect some resistance. As usual, I begin with a critique of our still

prevailing paradigms. Existing theoretical models, to the extent that they include ecological factors, tend to define them as sociological givens rather than as elements that are modifiable. This theoretical stance is reflected in method as well as substance. Specifically, in ecological research, we tend to place primary if not exclusive reliance on naturalistic observation, and to regard experimentation as suspect and ecologically invalid almost on principle. In my judgment, this is a mistaken view on several counts. To begin with, I believe that ecologically valid experiments can be conducted not only outside the laboratory but within it, provided the criteria I have outlined are met. But the fact that something can be done does not necessarily mean that it should be. On the latter score, I offer first the usual argument that only an experiment, with clearly defined treatments and adequate controls, can settle issues of cause and effect. But I find two other reasons even more compelling. Some of you may have heard me before expound upon two complementary principles that I regard as of primary importance in the scientific study of human development. The first of these is perhaps most cogently expressed in the words of Professor A. N. Leontiev of the University of Moscow. At the time, a decade ago, I was an exchange scientist at the Institute of Psychology. We had been discussing differences in the assumptions underlying research on on socialization in the Soviet Union and in the United States. Professor Leontiev's prescient statement was the following: "It seems to me that American researchers are constantly seeking to explain how the

child came to be what he is; we in the U.S.S.R. are striving to discover not how the child came to be what he is, but how he can become what he not yet is."

One reason why I remember Professor Leontiev's challenging comment is that it echoed the advice given me a quarter of a century earlier by my first mentor in graduate school Professor Walter Fenno Dearborn of Harvard. In his quiet, crisp New England fashion, he once remarked: "Bronfenbrenner, if you want to understand something, try to change it." I see these two mutually reinforcing principles as particularly relevant for research on the ecology of human development. The first is important because it takes cognizance of the adaptability of our species to an amazing variety of ecological conditions both across time and space. We shall obtain only a myopic view of human potentialities if we restrict ourselves solely to the ecological systems that happen to exist in our own culture or subculture at this particular moment in history.

As for Dearborn's injunction, it is significant for us not because it permits a more critical test of hypotheses, but exactly for what it says: "If you want to understand something, try to change it." More explicitly, if you want to understand the relation between the developing person and some aspect of his environment, first take a good look, but then try to budge one, and see what happens to the other.

What I am urging is a reversal of our usual procedure of relegating the contrived experiment to the last stage of the research. Instead, I advocate moving it right up front to the beginning, but for a different purpose: not to test hypotheses, but to get some notion of the

delicate balance, the fit between the developing organism and its surround, for therein lies the crux of the ecology of human development.

With an earnest entreaty to love, honor, and perhaps even to obey Leontiev's Law and Dearborn's Dictum, I complete this analysis of the requirements and rewards of an ecological approach to human development. In conclusion, I would stress two points:

First, in attempting to identify and emphasize what I regard as the most distinctive and promising aspects of an ecological model, I do not desire in any way to detract from the importance of other types of investigation in our field, including more traditional approaches to the investigation of environmental influences on human development. In science, it is important to go down many roads, for one cannot know in advance which roads lead to blind alleys and which to breakthroughs.

Second, I wish to make explicit what I am sure is readily apparent; namely, that throughout this exposition I have drawn extensively on the work of others presented both prior to and, especially, during this present conference. If I have cited few colleagues by name, it is simply because there are too many of them. From this point of view, this presentation is as much yours as it is mine. I hope I have done you justice.

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