Strategy & Leadership

Self-organization: The irresistible future of organizing

Margaret J. Wheatley Myron Kellner-Rogers

by Margaret J. Wheatley and Myron Kellner-Rogers

Meg Wheatley and Myron Kellner-Rogers are co-authors of A Simpler Way *(Berrett-Koehler, September 1996) and partners in the consulting firm of Kellner-Rogers & Wheatley, Inc. Together they also lead the work of The Berkana Institute, a non-profit educational and research foundation seeking new organizational forms. Meg is author of the award-winning best-seller,* Leadership and the New Science.

THE IRRESISTIBLE FUTURE OF SELF-ORGANIZATION: ORGANIZING

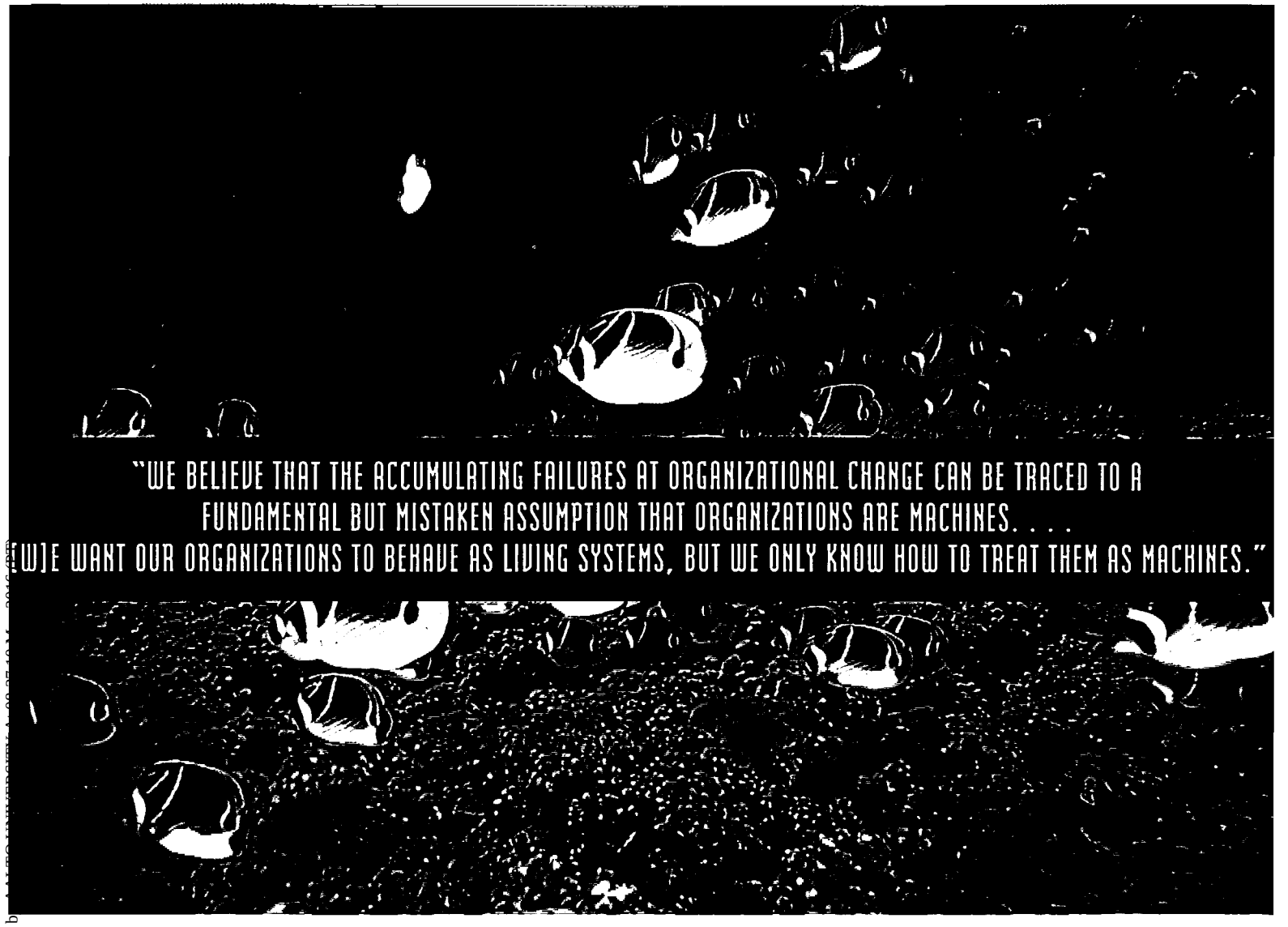
Why do so many people in organizations feel discouraged and fearful about the future? Why does despair only increase as the fads fly by, shorter in duration, more costly in each attempt to improve? Why have the best efforts to create significant and enduring organizational change resulted in so many failures? We, and our organizations, exist in a world of constant evolutionary activity. Why has change become so unnatural in human organizations?

We believe that the accumulating failures at organizational change can be traced to a fundamental but mistaken assumption that organizations are machines. Organizations-as-machines is a 17th century notion, from a time when scientists began to describe the universe as a great clock. Our modern belief in prediction and control originated in these clockwork images. Cause and effect were simple relationships; everything could be known; organizations and people could be engineered into efficient solutions. Three hundred years later, we still search for "tools and techniques" and "change levers"; we attempt to "drive" change through our organizations; we want to "build" solutions and "reengineer" for peak efficiencies.

But why would we want an organization to behave like a machine? Machines have no intelligence; they follow the instructions given to them. They only work in the specific conditions predicted by their engineers. Changes in their environment wreak havoc because they have no capacity to adapt.

These days, a different ideal for organizations is surfacing. We want organizations to be adaptive, flexible, self-renewing, resilient, learning, intelligent—attributes found only in living systems. The tension of our times is that we want our organizations to behave as living systems, but we only know how to treat them as machines.

It is time to change the way we think about organizations. Organizations are living systems. All living systems have



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the capacity to *self-organize*, to sustain themselves and move toward greater complexity and order as needed. They can respond intelligently to the need for change. They organize (and then reorganize) themselves into adaptive patterns and structures *without any externally imposed plan or direction.*

Self-organizing systems have what all leaders crave: the capacity to respond continuously to change. In these systems, change is the organizing force, not a problematic intrusion. Structures and solutions are temporary. Resources and people come together to create new initiatives, to respond to new regulations, to shift the organization's processes. Leaders emerge from the needs of the moment. There are far fewer levels of management. Experimentation is the norm. Local solutions predominate but are kept local, not elevated to models for the whole organization. Involvement and participation constantly deepen. These organizations are experts at the process of change. They understand their organization as a process of continuous organizing.

Self-organization offers hope for a simpler and more effective way to accomplish work. It challenges the most fundamental assumptions about how organization happens and the role of leaders. But it is not a new phenomenon. We have lived our entire lives in a self-organizing world. We watch self-organization on TV in the first hours after any disaster. People and resources organize without planning into coordinated, purposeful activity. Leaders emerge and recede based on who is available and who has information. Everything happens quickly and a little miraculously. These self-organized efforts create effective responses long before official relief agencies can even make it to the scene.

In the history of organizational theory, we have known about self-organization. Years ago, we called it the "informal organization." This was a description of what people did in order to accomplish their work. Often people ignored the formal structures, finding them ineffective

and unresponsive. They reached out for the resources and relationships they needed; they followed leaders of their own choosing, those they knew they could rely on.

A more recent description of self-organization is found in a new term that describes organizations as "communities of practice." These "communities" are webs of connections woven by people to get their work done. People organize together based on their perception of needs and their desires to accomplish. The Xerox Corporation promotes this concept by stating that a successful company must acknowledge the power of community and adopt those "elegantly minimal processes" that allow communities to emerge.

And the Worldwide Web is probably the most potent and visible example of a self-organizing network forming around interests, the availability of information, and unbounded access to one another. It will be interesting to observe the Web's future now that control issues have become a paramount concern.

While there are many other examples of self-organization occurring in our midst, including well-documented experiences with self-managed teams, we will simply note that self-organization is not a new phenomenon. It has been difficult to observe only because we weren't interested in observing it. But as we describe organizations as living systems rather than as machines, self-organization becomes a primary concept, easily visible.

Order in Complex Systems

In the natural sciences, the search to understand self-organization derives from a very large question. How does life create greater order over time? Order is the unique ability of living systems to organize, reorganize, and grow more complex. But theoretical biologist Stuart Kauffman has demonstrated that the inevitable desire to organize is evident even in a non-living system of light bulbs. Kauffman constructed a network of 200 light bulbs, connecting one bulb to the behavior of only two others (using Boolean logic). For example, light bulb 23 could be instructed to go on if bulb 46 went on, and to go off if bulb 67 went on. The assigned connections were always random and limited to only two. Once the network was switched on, different configurations of on-and-off bulbs would illuminate. The number of possible on/off configurations is 10^{30}, a number of inconceivable possibilities. Given these numbers, we would expect chaos to rule. But it doesn't. The system settles instantly (on about the fourteenth iteration) into a pattern of on/off bulbs that it then continues to repeat.

A few simple connections are sufficient to generate orderly patterns. Complex behavior originates from simple rules of connection. Order is not predesigned or engineered from the outside. The system organizes itself. We live in a universe, states Kauffman, where we get "order for free."

Emergence: The Surprise of Complexity

Social insects, bird flocks, fish schools, human traffic jams, all exhibit well-synchronized, highly ordered behaviors. Yet these sophisticated movements are not directed by any leader. Instead, a few rules focused at the local level lead to coordinated responses. Computer simulations that mimic flocking, swarming, or schooling behaviors program in only two or three rules for individuals to follow. There is never a rule about a leader or direction. The rules focus only on an individual's behavior in relation to that of its neighbors. Synchronized behavior emerges without orchestrated planning. (Recent commentators on the history of science note that scientists consistently avoided the conclusion that there was no leader. The belief in the need for planning and authority runs deep in Western thought.)

A startling example of complex and coordinated behavior emerging without leaders or plans is found in a species of termites. In Africa and Australia, certain termites build intricate towers 20 to 30 feet high; these are the largest structures on earth proportionate to the size of their builders. These towers are engineering marvels, filled with intricate chambers, tunnels, arches, and air-conditioning and humidifying capabilities. Termites accomplish this feat by following a bizarre job description. They wander at will, bump up against one another, and react. They observe what others are doing and coordinate their own activities with that information. Without blueprints or engineers, their arches meet in the middle.

Whether it be light bulbs, birds, termites, or humans, the conditions that create organization are the same. Individuals are similarly focused. Members develop connections with one another. Each determines its behavior based on information about what its neighbors are doing and what the collective purpose is. From such simple conditions, working communities emerge, self-organizing from local connections into global patterns and processes. Nothing is preplanned; patterns of behavior emerge that could not be predicted from observing individuals.

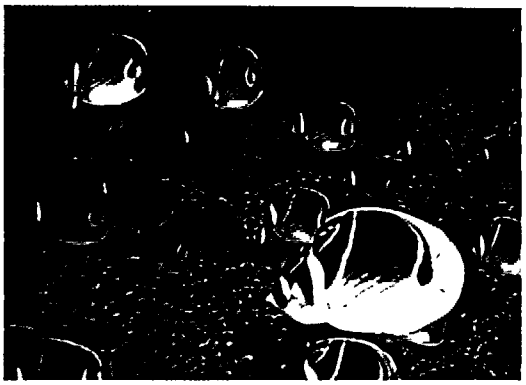
There is much to startle us in these scientific visions of how life organizes itself. Can human organizations be more intentionally self-organizing?

Three Conditions of Self-Organizing Organizations

If complex systems emerge from simple initial conditions, then human organizations similarly can be rooted in simplicity. During the past few years, our own search has focused on the simple conditions that support an organization's capacity to access its intelligence and to change as needed. We have seen evidence of these conditions in a wide variety of settings: in world-wide manufacturers, in schools, in experiments with future battle strategy in the U.S. Army.

Organizations assume different forms, but they emerge from fundamentally similar conditions. A self gets organized. A world of shared meaning develops. Networks of relationships take form. Information is noticed, interpreted, transformed. From these simple dynamics emerge widely different expressions of organization. We have identified these essentials as three primary domains: identity, information, and relationships.

Identity—the sense-making capacity of the organization. How does an organization spin itself into existence? All organizing efforts begin with an intent, a belief that something more is possible now that the group is together. Organizing occurs around an identity—there is a "self" that gets organized. Once this identity is set in motion, it becomes the sense-making process of the organization. In deciding what to do, a system will refer back to its sense of self. We all interpret events and data according to who we think we are. We never simply "know" the world; we create worlds based on the meaning we invest in the information we choose to notice. Thus, everything we know is determined by who we think we are.



"Only when information belongs to everyone can people organize rapidly and effectively around shifts in customers, competitors, or environments."

As we create perceptions of the world, we primarily use information that is *already in us* to make sense of something new. Biologist Francisco Varela explains that more than 80 percent of the information we use to create visual perceptions of the world comes from information already *inside* the brain. Less than 20 percent of the information we use to create a perception is external to the brain. Information from the outside only perturbs a system; it never functions as objective instructions. Varela describes this in an important maxim: "You can never direct a living system. You can only disturb it." This explains why organizations reject reports and data that others assume to be obvious and compelling. A system will be disturbed by information based on what's going on inside the organization—how the organization understands itself at that moment. This maxim also explains why organizations are never changed by assembling a new set of plans, by implementation directives or by organizational restructurings. You can never direct a living system, you can only disturb it.

The self the organization references includes its vision, mission, and values. But there is more. An organization's identity includes current interpretations of its history, present decisions and activities, and its sense of its future. Identity is both what we want to believe is true and what our actions show to be true about ourselves.

Because identity is the sense-making capacity of the organization, every organizing effort—whether it be the start-up of a team, a community project, or a nation—

needs to begin by exploring and clarifying the intention and desires of its members. Why are we doing this? What's possible now that we've agreed to try this together? How does the purpose of this effort connect to my personal sense of purpose, and to the purposes of the larger system?

Think for a moment of your own experiences with the start-up activities of new projects or teams. Did the group spend much time discussing the deeper and often murkier realms of purpose and commitment? Or did people just want to know what their role was so they could get out of the meeting and get on with it? Did leaders spend more time on policies and procedures to coerce people into contributing rather than try to engage their desire to contribute to a worthy purpose?

Most organizing efforts don't begin with a commitment to creating a coherent sense of identity. Yet it is this clarity that frees people to contribute in creative and diverse ways. Clear alignment around principles and purposes allows for maximum autonomy. People use their shared sense of identity to organize their unique contributions. (This critical partnering of high alignment and high autonomy also appears in Information Technology discussions as design criteria for creating effective distributed data processing or client server systems.)

Organizations lose an enormous organizing advantage when they fail to create a clear and coherent identity. In a chaotic world, organizational identity needs to be the most stable aspect of the endeavor. Structures and programs come and go, but an organization with a coherent center is able to sustain itself through turbulence because of its clarity about who it is. Organizations that are coherent at their core move through the world with more confidence. Such clarity leads to expansionary behaviors; the organization expands to include those they had kept at bay—customers, suppliers, government regulators, and many others.

Information—the medium of the organization. Information lies at the heart of life. Life uses information to organize itself into material form. What is information? We like Gregory Bateson's definition, "Information is a difference which makes a difference," and Stafford Beer's explanation that "Information is that which changes us." When a system assigns meaning to data—"in-forms" it—data then becomes information.

Complex, living systems thrive in a zone of exquisitely sensitive information-processing, on a constantly changing edge between stability and chaos that has been dubbed "the edge of chaos." In this dynamic region, new information can enter, but the organization retains its identity. Contradicting most efforts to keep organizations at equilibrium, living systems seem to seek this far-from-equilibrium condition to stay alive. If a system has too much order, it atrophies and dies. Yet if it lives in chaos, it has no memory. Examples of both these behaviors abound in corporate America. The implosion of IBM and General Motors evidences how sophisticated information and measurement systems could create a sense of internal order while failing to allow for critical new information. And during the 1980s, many firms reached out chaotically without any sense of identity to markets and businesses they were incapable of managing.

Information that flows openly through an organization often looks chaotic. But it is the nutrient of self-organization. As one utility chief executive aptly put it: "In our organization, information has gone from being the *currency of exchange*—we traded it for power and status—to being the *medium* of our organization. We can't live without it; everyone feeds off of it. It has to be everywhere in the organization to sustain us."

Only when information belongs to everyone can people organize rapidly and effectively around shifts in cus-

tomers, competitors, or environments. People need access to information that no one could predict they would want to know. They themselves didn't know they needed it until that very moment.

To say that information belongs to everyone doesn't mean that all decisions move to the most local units. When information is available everywhere, different people see different things. Those with a more strategic focus will see opportunities that others can't discern. Those on a production line similarly will pick up on information that others ignore. There is a need for many more eyes and ears, for many more members of the organization to "in-form" the available data so that effective self-organization can occur. But it is information—unplanned, uncontrolled, abundant, superfluous—that creates the conditions for the emergence of fast, well-integrated, effective responses.

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Relationships—the pathways of organization.

Relationships are the pathways to the intelligence of the system. Through relationships, information is created and transformed, the organization's identity expands to include more stakeholders, and the enterprise becomes wiser. The more access people have to one another, the more possibilities there are. Without connections, nothing happens. Organizations held at equilibrium by well-designed organization charts die. In self-organizing systems, people need access to everyone; they need to be free to reach anywhere in the organization to accomplish work.

To respond with speed and effectiveness, people need access to the intelligence of the whole system. Who is available, what do they know, and how can they reach each other? People need opportunities to "bump up" against others in the system, making the unplanned connections that spawn new ventures or better integrated responses.

Where members of an organization have access to one another, the system expands to include more and more of them as stakeholders. It is astonishing to see how many of the behaviors we fear in one another dissipate in the presence of good relationships. Customers engaged in finding a solution become less insistent on perfection or detailed up-front specifications. Colleagues linked by a work project become more tolerant of one another's diverse lives. A community invited into a local chemical plant learns how a failure at the plant could create devastating environmental disasters, yet becomes more trusting of plant leadership.

The Dynamics of Self-Organization

The domains of identity, information, and relationships operate in a dynamic cycle so intertwined that it becomes difficult to distinguish among the three elements. New relationships connect more and more of the system, creating information that affects the organization's identity. Similarly, as information circulates freely it creates new business and propels people into new relationships. As the organization responds to new information and new relationships, its identity becomes clearer at the same time that it changes.

Earlier we stated that self-organization is not new in our experience of organizations, it just takes different eyes to see it. Self-organization has been going on all the time, but our attention has been diverted to perfecting the controls and mechanisms that we thought were making work happen. It is our belief that most people, whatever their organization, are using information, relationships, and identity to get work done. They work with whatever information is available, but it is usually insufficient and of poor quality. If they need more, they create misinformation and rumors. But always they are organizing around information. People also work with whatever relationships the system allows, often going around the system to make critical connections. Most people know which relationships would bolster their effectiveness, although this awareness may be voiced only as complaints. And as they do their work and make decisions, employees reference the organizational identity that they see and feel—the organization's norms, unspoken expectations, the values that are rewarded.

When errors or problems occur, the real work is to look into the domains of self-organization and determine what's going on at this subterranean level. In organizations, problems show up in behaviors, processes, or structures. Once we diagnose the problem, our collective practice has been to substitute new behaviors, new structures, new processes for the problematic elements. But this seldom works. The problems that we see in organizations are artifacts of much deeper dynamics occurring in the domains of information, relationships, or identity. If we can inquire at this deeper level, if we can inquire into the dynamic heart of organizing, both the

problem and the solution will be discovered.

We observed the power of inquiring into these depths in a DuPont chemical plant in Belle, West Virginia. Safety had been a major focus for many years, addressed in many different ways. They had moved from 83 recordable injuries to none. But after more than a year with no recordable injuries, three minor personal accidents occurred within a few months. The leadership team knew from past experience that the solution to their safety problems did not lie in new regulations. Instead, they examined the organization in terms of these originating dynamics of identity, information, and relationships. What were they, as leaders, trying to accomplish? Did they still believe in their principles? How were their relationships with one another? Did everyone still have access to all information? These leaders could have responded in more traditional ways. They could have initiated disciplinary action, more regulations, safety training classes, or increased supervision. Instead, they questioned themselves more deeply and noted that because of several new members, they were no longer guided by the same shared clarity about safety. The re-creation of that clarity restored them to superior levels of safety performance.

If self-organization already exists in organizations—if people are naturally self-organizing—then the challenge for leaders is how to create the conditions that more effectively support this capacity. They do this by attending to what is available in the domains of information, relationships, and identity.

Leaders in Self-Organizing Organizations

What do leaders do in self-organizing organizations? As their organizations move towards a mode of operating that seems to exclude most traditional activities of planning and control, is there a role for leaders? Absolutely. Leaders are an essential requirement for the move toward self-organization. This is not laissez-faire management disguised as new biology. Given existing hierarchies, only leaders can commit their organizations to this path. But their focus shifts dramatically from what has occupied them in the past. In our work, we have observed many of the pleasures and perils of leaders on this path. We also are aware of some of the siren calls that seem to threaten the resolve of even the clearest of leaders.

The path of self-organization can never be known ahead of time. There are no prescribed stages or models. "The road is your footsteps, nothing else," as the South American poet Machados wrote. Therefore, leaders begin with a strong *intention*, not a set of action plans. (Plans do emerge, but locally, from responses to needs and contingencies.) Leaders also must have confidence in the organization's intelligence. The future is unknown, but they believe the system is talented enough to organize in whatever ways the future requires. This faith in the organization's ability and intelligence will be sorely tested. When there are failures, pressures from the outside, or employee resistance, it is easy to retreat to more traditional structures and solutions. As one manager describes it: "When things aren't going well, we've had to resist the temptation to fall back to the *perceived* safety of our old, rigid structures. But we know that the growth, the creativity, the opening up, the energy improves only if we hold ourselves at the edge of chaos."

The path of self-organization offers ample tests for leaders to discover how much they really trust their employees. Can employees make wise decisions? Can they deal with sensitive information? Can they talk to the community or government regulators? Employees earn trust, but leaders create the circumstances in which such trust can be earned.

Because dependency runs so deep in most organizations, employees often have to be encouraged to exercise initiative and explore new areas of competence. Not only do leaders have to let go and watch as employees figure out their own solutions, they also have to shore up their self-confidence and encourage them to do more. And leaders need to refrain from taking credit for their employees' good work—not always an easy task.

While self-organization calls us to very different ideas and forms of organizing, how else can we create the resilient, intelligent, fast, and flexible organizations that we require? How else can we succeed in organizing in the accelerating pace of our times except by realizing that organizations are living systems? This is not an easy shift—changing one's model of the way the world organizes. It is work that will occupy most of us for the rest of our careers. But the future pulls us toward these new understandings with an insistent and compelling call. ■

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