participation in democratic control viewed by a physiologist

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I teach medical physiology and pathophysiology to undergraduates in medicine. I use the systems approach, which makes it easy to understand the pathology (and the treatment) of more complex relationships. Occasionally I sidestep into sociological examples - when triggered by a publication in the daily press - to show the students the applicability of this approach to systems of all different kinds (including the pathology of those systems). I focus my work on feedback systems, since they occur abundantly within our body and in sociological organisations. This is quite essential, since intuitive reasoning often leads one onto the wrong track when loops are involved.

As a member of the faculty of medicine I am involved in many management activities: member of the faculty council, of several committees of the board of our department, chairman of the departmental committee on teaching (education) and member of the board of the Dutch Physiological Society. I also participated in various committees of the university. Several years ago I partook in a major change of our medical curriculum

and some years later I could intimately follow the effects of the democratization of university, faculty and department by a too quickly conceived 'law on the reform of university management' (Wet Universitaire Bestuurshervorming: WUB). I am, of course, also a citizen of The Netherlands and of the local municipality. In the latter quality I became involved with a major conflict on a planological subject, which dragged on for a period of five years. In al these activities I was aided considerably by the use of simple feedback diagrams for the analysis of the respective control systems at the sociological levels. They enabled me to understand the processes and to initiate adequate measures or countermeasures in situations which otherwise would have been of a quite murky nature to me.

Within the last decade a new kind of organization arose within our country, which might be called "participation democracy' (inspraak medezeggeschap): members of all different kinds of organizations (faculties, enterprises, municipalities, and the citizens of our country as such) get a formal hearing on proposed plans (in Dutch called 'hearings'). An accepted non-formal variation is the activity of 'action groups' (actiegroepen) which by their own initiative fight plans or laws or try to initiate new activities. All this is accompanied by a feeling of 'failure of our democratic system in a world that has become too complex'. So, the individual experiences a problem of levels (the organizations of which he is a member exhibit

properties which he can no longer under stand)' and, hence, of boundaries which he cannot transcend. Some, however, have discovered that setting up an action group is quite an effective means to cross such a boundary. They are aided by a general kind of permissiveness for these kinds of actions, which is based on feelings of frustration with the murkiness of our organizational structures and activities.

I will therefore start with an analysis of the structure of participation democracy. I will restrict myself to a quasi-steady-state approach, which is sufficient for a basic understanding of many processes. Specific dynamic features (such as the generation of cycles) will be left out of consideration (and literature on that subject is already quite abundant (e.g. Tustin 1957, Philips 1954, and Van Duijn 1978) although not available to the average citizen).

Basic concepts and assumptions

Sociological structures will be represented by block diagrams. Each block pictures an organizational unit, for which I will use the terminology derived from the governmental structure of a country, but which can be applied to any management structure. The block H represents the House of parliament or a council; G the government cabinet or a board, D a department or other executive service (of which there are usually more than one, but I will depict one only in the diagrams); and P the population as a whole, or the collection of members of

an organization such as a municipality. factory, firm, university. faculty, etc.

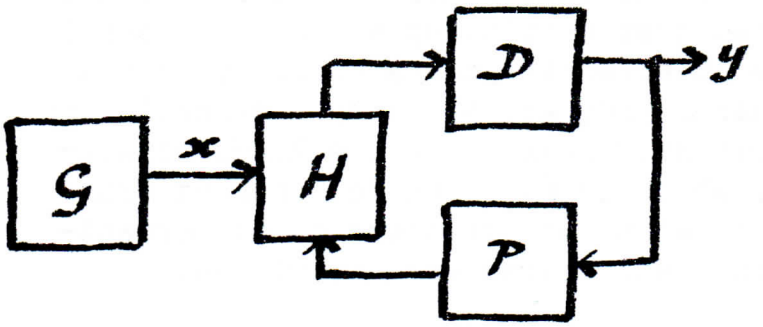

Fig. 1. Diagram, of a governmental system. Arrows indicate lines of action. Initiative x and final steady state result y.

An unit also exerts a certain amount of power. I will not discuss the quite complex nature of the concept of power, but for the introduction of a calculation component called the power factor, which is roughly related to the amount of people involved. Consider a small group of people interacting with each other in an ideal democratic structure:

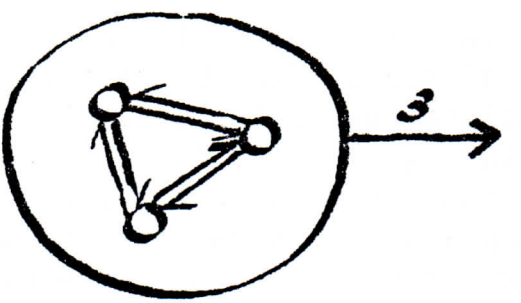

Fig. 2. A unit with Q=3 members. Interaction indicated by arrows. Power factor of Q=3 gives influence upon its surroundings.

Each individual will exert influences upon the others and will be influenced by them. The average amount of influence in space and time exhibited by each individual will be called the 'power factor' and I assign a unit value to this amount of influence. The whole group is then able to influence its surrounding groups with a power factor equal to the group size (i.e. a group of Q persons has a power factor equal to Q units). Power transfer is possible, for instance from a group to its leader or from a group to a super-structure (DELEGATION of power), or is taken over by force (USURPATION of power). Note that power transfer also involves a change of level (from individual to its group),

For a given unit (Fig. 3) the effect of its power factor will be a multiplication of its input by the power factor Q. For example: an uncontrolled department of public works will transform its instruction to build a town hall according to a given plan and costs x into a veritable palace which now has to be paid far by Qx monetary units. Or a given law will not be executed according to its-intention x but enforced to the letter: Qx, dependent upon the power of that department. The power factor hence

Fig. 3. Influence of the power factor Q upon the executive activity of an organizational unit. Q acts as a multiplicator.

is concerned with EXECUTIVE power. The symbol indicating a unit will also represent its power factor .

A second aspect of power is the power to INITIATE ideas, laws, measures or decrees.

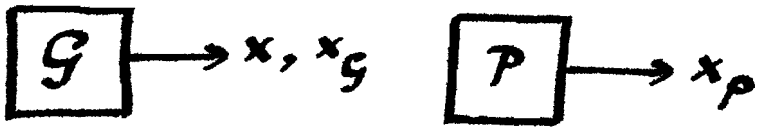

Fig. 4. The power to initiate concepts, rules, etc. is symbolized by a unit with a direct indication of the concept x. Subscripts are used to indicate the source in case of multiple sources.

Such an idea, etc. will be indicated by the letter x. In case of more sources a subscript will indicate the source: x_G and x_P then stand for a governmental or population source respectively (Fig. 4).

A third aspect of power is the power to perform WEIGHTED DECISIONS. A typical body in this respect is the House of Parliament or a council. This kind of power will be represented by two diagonals drawn within the block (Fig. 5). Plus and/or minus signs represent the decision process algebraically, The capital letter is the executive power of such a unit.

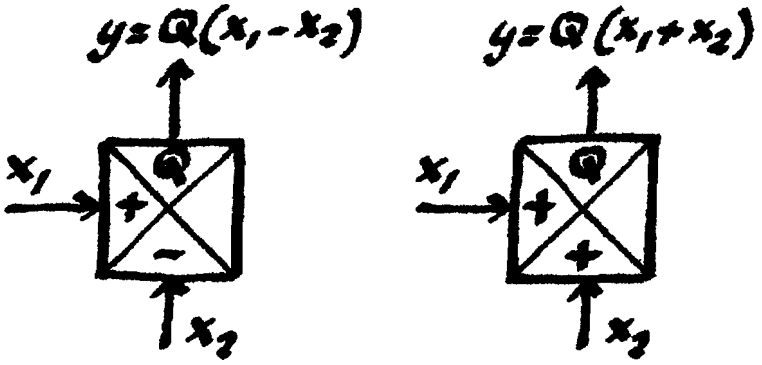

Fig. 5. Units with the power to perform weighted decisions. Here the executive Power Q is also taken into consideration. This has the effect of a multiplication of the decision (x_1-x_2 at the left unit, x_1+x_2 at the right one) with Q. Note that the right block changes into the left one for a negative sign, of its input x_2.

We will finally assume that all ideas and all activities are well-minded and are planned for the benefit of the whole system. This assumption is essential in order to understand the seemingly paradoxical and certainly counter-intuitive behavior of our system. Note from what follows that this already occurs upon the step from the level of the unit to that of the next higher system! Thus, a participation democracy is pictured as in Fig. 6.

Participation Democracy: David and Goliath

The structure of a participation democracy is pictured in Fig. 6. An action group of a

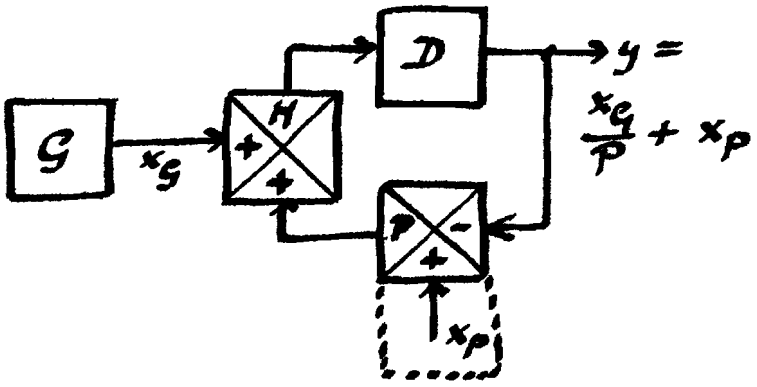

Fig. 6. Participation democracy. The participants P judge the (reworked) governmental initiatives x_G on the basis of their own goals x_P. Here $y = x_P + x_G/P$.

participating part of the population P with its own goals x_P reacts upon plans y reached via the customary route and reflecting the governmental intentions x_G. The end result of this process is given by what I like to call the David and Goliath equation (1).

$$y = DH \{ x_G + P (x_P - y)\},$$

or

$$y = \{DHP/(1 + DHP)\}(x_G/P + x_P). \qquad (1)$$

When all participating units H, D and P are sufficiently powerful the first quotient is equal to one, resulting in

$$y = x_G/P + x_P. \qquad (2)$$

Given the realistic and necessary assump-

tion that house and department are quite powerful (Goliath), it follows that even a relatively weak action group (David) is able to quench the governmental initiative and substitute its own ideas in place of this, if it succeeds to insert itself into such a decision loop:

$$y = x_P. \qquad (3)$$

Assign for instance the power factor of 1000 to house and department each and one of 10 (i e:.. 1/100 000th of the combined power of parliament and department) to the participating group. The $0.1x_G$ component already means annulment. In meeting or assemblies one often sees this happening and a wise board then adopts the proposal xP (especially when it does not diverge too much from its own) or semi-adopts it "for consideration" while it postpones the decision (application of the delay tactic). There are no problems when

$$x_G = x_P$$

since (3) will then result and the action will be necessary too, to prevent "excessive embellishment"

$$y = DHx_G$$

which will occur in the absence of control

$$P = 0.$$

In such a case an action group or the formal participation in fact 'steps in' because of a parliamental malfunction in its controlling obligations. When this does not occur, then the results are quite dramatic. I here mention the recent case of the tunnel below the Dordtse Kil river near

the City of Dordrecht in the Netherlands. In 1970 building of the tunnel was agreed upon for a price of 45 million Dutch Florins (about 22 million US $); to be built by the Department of Buildings, Roads and Waterworks. This department in fact embellished upon the plan. When the tunnel became ready, in 1977, the expected price (including 10% inflation per year and assuming regular payments for the work each year) is 67 million florins. The actual price was, however, 150 million florins: 225% of what is reasonable. The situation was published on April 9th, 1931, on television, because the City of Dordrecht faced acute bancruptcy and asked the government to help her, also since the cause was clear: lack of control over this department (which is often called 'a state within a state').

It follows that action groups or the formal installation of participation democratical structures are an effective means to combat either slackness of parliament or (and) discrepancy between governmental initiatives (or extraneous initiatives generated by groups operating behind the scenes within or into G, H, or D) and the wishes of the population (or the members of a firm or faculty). It also follows that differences in level - given by the size of the power factors of the controlling structure GHD and those of the action group or the participating group do not play a role: an active minority which is relatively weak, is able to usurp a giant and powerful organization: the David and Goliath effect. The cause? Goliath listens to David.

Participation Democracy: Dictature of the Minority or Inertia (Implosion)

Equation (2) shows that participation democracy is a quite dangerous tool to rely upon. A successful minority may impose its will upon a giant organization, quite contrary to the intentions of the population as a whole, when the population at large is demoralized (such as may be the result of the unjustified induction of feelings of powerlessness into each individual member of a giant organization). When the situation is somewhat less extreme other groups with other ideas will also enter the process when (3) is about to take place. The next cycle will see x_{P1} suppressed and replaced by x_{P2}. This may go on with the result that the output y of the system is effectively reduced to zero for all initiatives x, whatever their origin may be. It 'implodes' into inertia and shows an extreme resistance against all changes. Within the Dutch universities this effect was quite clear immediatly after the introduction of the mentioned WUB-law. We became engulfed by a 'meeting-sickness' with endless deliberations on details of minor importance and it took us about two years to grow out of it. But it still is quite a hard task to achieve minor changes. Major changes can now only be effected by law. Within the press the universities are today often blamed for their conservatism. The conservatism indeed exists, but the blame rests on the bad structure of the law which was prescribed without any provision to meet the obvious side-effects.

The effect of implosion and, therefore, inertia will be even more clear when participation is installed for a controlling action only (2): negative participation. In such a situation the loop is created to counteract the multiplicative effect of an open line (Fig. 7). The intuitive intention behind the generation of this kind of democracy is, of course, to balance x and y: to achieve x = y. The word 'feedback' is often used in this context as a kind of magic cure for all (and the terms 'democracy' and 'feedback' appear to be synonymous).

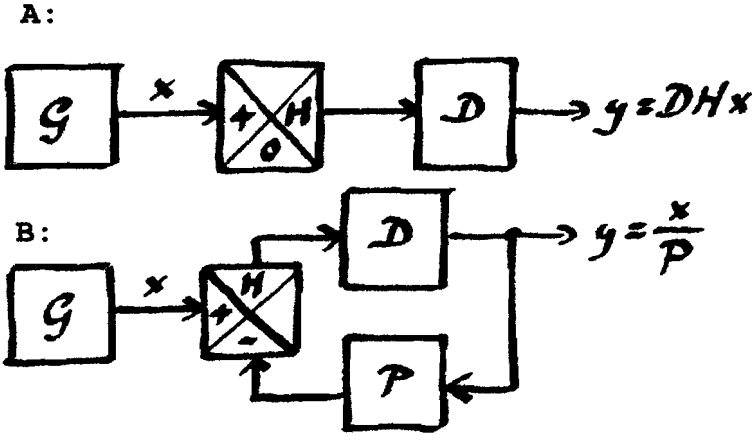

Fig. 7. A. Zero participation where y = DHx
B: negative participation with
y = x/P.

Negative participation implies that

$$x_P = 0 \quad (4)$$

with the intention

$$y = x \text{ (with } x = x_G) \quad (5)$$

to combat

$$y = DHx \quad (6)$$

but results in

$$y = x/P \quad (7)$$

which effectively gives

$$y = 0 \quad (8)$$

(a special case of (1)-(3)). The effect of (7) and, hence, (8) often is intentionally used to achieve other ends in phenomena such as strikes, punctuality actions and also in terrorist actions (the list does not imply ethical judgements on my behalf but is descriptive) and today by action groups, in order to gain entrance into decision making structures.

For a population at large (7) and (8) are, of course the plausible expectations for measures such as referenda as a means of government by the people (quite apart from the oversimplification necessary in such situations).

It follows, that democracy by participation seems to be a good idea, but the results are quite bad and do not live up to expectations. To suddenly impose this kind of structure upon a reasonably running organization is irresponsible, when no additional safeguards are built in. It is a sure means to kill it, or at least to drastically slow down its activity. It also follows that action groups who want to quench some plan should not be deterred by any measure taken against them. When they go on despite everything they will be sure to succeed, especially when they divide themselves into small parts of which only one is visible at a time and others are, therefore, available to take over their work when necessary: the majority will be lost once they listen to the group.

Supportive Participation: Dictature of the Majority (Explosion)

The foregoing discussion might lead to the idea that a positive approach in participation will be of value (something like: "my country: right or wrong"). The participants then support their government in its decisions. One may either achieve this in the block diagrams by changing the minus-sign in Fig. 7.B. into a plus:

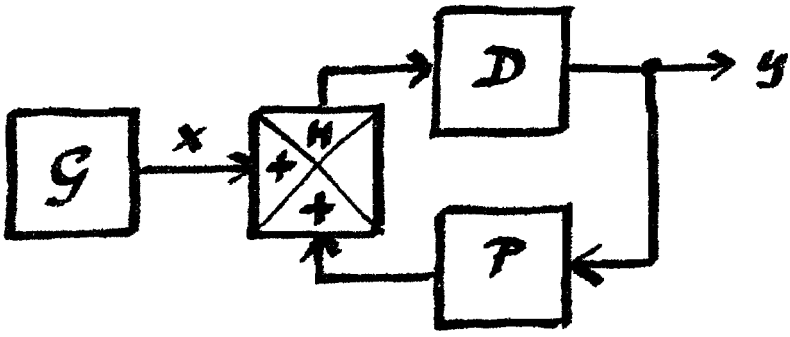

Fig. 8. Supportive participation. The result y tends to outgrow the intention x out of all bounds: positive feedback leading to total madness (explosion)

or by decreasing the value of P in Fig. 6 (and the corresponding equations) below one. The latter procedure tells us (change P into 1/P*) that the wishes of P are still executed, but that the governmental initiatives are exaggerated. Fig. 8, (and a negative value of P in Fig. 6) shows us what happens with wholehearted support

$$y = DH\ (x + Py)$$

or

$$y = \{ DH /(1 - DHP)\} x. \qquad (9)$$

This is the case of positive feedback: the system explodes, for 1-DHP passes through zero after the cycle is started upon the initiation of a wholeheartedly supported initiative x. Going repeatedly through the cycle of Fig. 8 will show this more convincingly. The few opponents in such a situation will be mowed down by the enthusiastic majority, hence the title of this paragraph. Germany's behavior shortly be fore and during World War II forms a classical example of the madness into which such a situation develops. It follows that such a system should never be allowed to occur. Demagogic or Messianic leaders, or the 'strong man' searched for by a population in distress, should never be allowed to govern unless a critical and effective opposition is safeguarded within such a system.

Zero Participation: Governmental Dictature

The case of zero participation has already been mentioned (Fig. 7.A.). Here

$$y = DHx . \qquad (10)$$

Note that the power P of the population has been usurped by the government, hence

$$HD = P, \qquad (11)$$

i.e. a government is at most as strong as its population is. In a participation system the transfer of power is much less and (11) applies only in cases of all-out war in which (11) is installed because of the state of emergency.

Good Intentions and Bad Results

We saw that good intentions, both with regard to the initiative x and to all the participating units, and also with regard to the proposed structures (introduction of feedback) result in bad effects. We either obtain the David and Goliath phenomenon which is in fact a dictature of the minority, or total inertia and conservatism (the imploded system) or total madness (the exploded system). The in-between situation implies a governmental dictature where excessive behavior is the result (with its peak in total dictature when feedback is absent.

In fact, the only systems of participative democracy in which a realistic result (5) is possible is that of Fig. 6 or 7.B. in which
i) either the input x has been changed into Px (generation of surplus value in order to negotiate to obtain x: a quite familiar process to anyone versed in controlling activities)., see arrow 'a' in Fig. 9.
ii) through coupling of y directly into H (true democracy) ; or
iii) to apply Goliath versus David methods.

Bad Methods for Good Results or Goliath VERSUS David

In a given participation democratic structure the power factor of P must be effectively reduced to one in order to equate y with x (results with intentions). G, H and D must therefore, either alone or in combination act according to this rule. In

this respect I am sure that anyone who is or has been engaged with governing activities in smaller or larger communities, either in the role of Goliath or in that of David, or both, must be familiar with these methods.

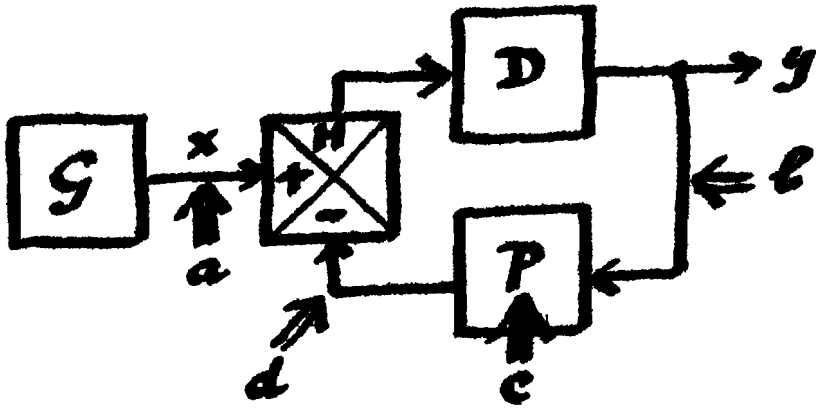

Fig. 9. Participative democracy. Double arrows indicate the places available for interference to obtain y = x either by multiplication with P (arrow a) or with 1 /P (b, c and d).

I will classify them according to the arrows b, c, and d of Fig. 9. respectively as: reduction of input into P (arrow b), direct reduction of the power of P (arrow c), and reduction of the entrance of P into H (arrow d). The problem is, of course, how to arrive at a reduction by exactly 1/P. Too weak a reduction will still result in inertia; too large a reduction in explosion. Here the most dangerous approach is direct reduction of P's power (arrow c). The methods (varying from mild induction of awe into P to outright threats) might provoke P into a counterreaction which actually strengthens P. Those methods are, therefore, bad methods leading to bad re-

sults (the system's inertia increases) and should be abandoned right from the beginning. There are, however, still many managers (both ripe and green) who never learn this lesson and still whack about when given the chance. The b-class of methods are not that drastic. They vary from giving partial information only, to snowing-under techniques (in writing: thick reports, much jargon) and verbally (talking for hours). Other methods in this class are left to the reader by way of an excercise. The d-group of methods (entrance reduction) vary from non-availability ("I am sorry but the boss is engaged in an important meeting. Please come back tomorow.") to line-prolongation (with the use of intermediate officials, endless forms to be filled in in multiplicate) and others (also left as an exercise, cf. Verveen 1980). Other means of direct power reduction (arrow c) are the lobby, or backbiting: they are applications of the divide-and-rule principle, An experienced P (or one who has read this paper and performed the mentioned exercises) will have no problems with the development of effective counter-measures to each of the mentioned (and other) methods (exercises). It follows, that no method is watertight. The system may work, but nothing can be guaranteed. Participation democracy must be discarded in favour of true democratic structures, unless - for a small organization ALL members are involved in a structure with positive participation.

Notes:

1. The case of the Dordtse Kil Tunnel was published by the VARA-television in Achter

Het Nieuws (Behind The News)on April 9, 1981 at 22.25. The calculation of the expected costs is mine.

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