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DESPOTISM AND IRRIGATION

I

In 1957 an important study on totalitarian state structures entitled *Oriental Despotism - a Comparative Study of Total Power* was published by Karl A. Wittfogel.¹ In it he analyses the types of society in which the power is wielded by despotic rulers - and not by independent owners or entrepreneurs (1963, p. 4). This is the type of state designated in Marxist terminology as the "Asiatic mode of production". Wittfogel established a link between both this mode of production and the occurrence of despotic structures on the one hand, and the presence of major water works on the other.

This Asiatic mode of production and Marx's views thereon have in recent years been the subject of much deep-going study by the French *Centre d'Etudes et de Recherches Marxistes*, with Wittfogel's views, among others, coming under fierce attack.²

The present article is restricted to one particular aspect of the argument, namely to the link established by Wittfogel between the presence of water works and the rise of "Oriental despotic states". Wittfogel uses the terms "Hydraulic Society", "Asiatic Society", "Agro-managerial Society" and "Oriental Society" synonymously in order thus to stress the close relationship between these phenomena (1963, p. 8). He observes with some emphasis that the presence of water works need not necessarily lead to government control, nor government interference to despotism (1963, p. 12). He illustrates the first point by referring to the Mormon irrigation works in the vicinity of Salt Lake City and the second with the government control of water works in the Netherlands. Only under certain specific conditions will hydraulic communities develop into despotically ruled societies of the Oriental type. Wittfogel

¹ For the present article the paperback edition of 1963 was used.

² The most important articles are collected in: *Sur le mode de production asiatique*, Paris 1969.

defines this process as follows: "If irrigation farming depends on the effective handling of a major supply of water, the distinctive quality of water — its tendency to gather in bulk — becomes institutionally decisive. A large quantity of water can be channeled and kept within bounds only by the use of mass labor; and this mass labor must be coordinated, disciplined, and led. Thus a number of farmers eager to conquer arid lowlands and plains are forced to invoke the organizational devices which — on the basis of premachine technology — offer the one chance of success: they must work in cooperation with their fellows and subordinate themselves to a directing authority." (1963, p. 18.) Once this decision has been made, the rest follows automatically. That is to say, a "hydraulic economy" develops, characterised by division of labour, intensive cultivation, and cooperation on a large scale (1963, p. 22), with the state assuming a managerial role. Viewed from this perspective, it makes no difference whether this form of organisation is based on independent development or has been copied from other civilisations (1963, p. 27 and note c.). We should note here, however, that Wittfogel is not so particular as to the nature of the water works in the remainder of his book. This creates the impression that when all is said and done, all water works are lumped together under one common denominator, irrespective of whether they involve irrigation, terracing, drainage, or dike construction — although there is a distinct difference between all these kinds of activities.³

Wittfogel further contends that in these hydraulic societies the state disposes over large labour forces. The labour of these is also frequently used for executing major non-hydraulic works such as building palaces, tombs, roads, and so on (1963, pp. 39, 42 ff.).

In Chapter III he discusses the managerial character of the hydraulic state in greater detail, while going into the totalitarian and non-benevolent nature of this type of government in Chapter IV, and the terror aspect of despotic administrations of this kind in Chapter V. After thus first establishing the main characteristics of Oriental despotism, the author next proceeds to trace the diffusion of this form of government, observing that there were also states lacking major water works which nonetheless possessed Orientally despotic governments. He ascribes the transfer of such patterns to borrowing and various contacts such as through conquests or the activities of hydraulic experts in areas outside

³ See, for instance, the article by Spencer and Hale 1961, and Kleinpenning 1968, pp. 171-200.

their homeland, and so on (1963, p. 192). In addition, "agrodespotic societies" may arise independently of hydraulic states "proper" (*op. cit.*, p. 193). Although these are rare exceptions, they may occur where the despotic order "fulfills the organizational and acquisitive functions of a hydraulic government".⁴

We shall leave Wittfogel here. Briefly summarized, his views are as follows:

- a. Irrigation schemes are essential where arid or semi-arid areas are cultivated by agrarian communities.
- b. Where irrigation works require the effective handling of large volumes of water, an efficient organisation is indispensable.
- c. This controlling organisation develops into a power on the pattern of "Oriental Despotism", the state fulfilling the role of manager.
- d. The populations of Orientaly despotic states usually construct water works etc. by corvee labour.
- e. Orientaly despotic states are ruled by terror. Their people are all reduced to a single social level.
- f. Wittfogel thinks it possible for this type of state to emerge independently of the presence of water works, though only by way of rare exception.

It is to this latter point that we wish to give special attention in the present article. For if it could be demonstrated that the type of state described by Wittfogel has developed independently of the existence of hydraulic works in more than one instance, the causal relationship presupposed by him would be invalidated.

II

As point of departure for an analysis of this problem we would use the political organisation of the Inca empire. There are several passages in "Oriental Despotism" demonstrating that this empire meets all of Wittfogel's criteria: here there is an obvious hydraulic pattern, heavy corvee labour is exacted of the population, industry is government

⁴ For a thorough criticism of Wittfogel's version of Russian history, see Dittrich 1964. The idea that the present Soviet Union is an Orientaly despotic state is especially fiercely opposed by the Marxists; see: Chesneau, pp. 15 ff.; Garaudy, pp. 9 ff. A favourable opinion on Wittfogel's work is expressed by the American anthropologist Harris, 1968, pp. 671-674.

controlled, there is a road network, the ruler is despotic, there is an extensive bureaucracy and a tight military organisation, terror is used, the authority over arable land is exercised by village communities, and so on. In short, in Wittfogel's own words, it is a "simple hydraulic society".

Van vorsten en volken (Claessen 1970a) attempts a comparison of the political organisation of the Inca empire — or Tahuantinsuyu — with four obviously non-hydraulic states, namely the Polynesian principalities of Tonga and Tahiti and the African kingdoms of Dahomey and Buganda. Detailed descriptions of each of the five types of organisation are followed by groups of data arranged according to the three key subjects, namely the ruler, the notables, and the common people. Within these three principal categories, the material was grouped into tables according to sub-categories (*op. cit.*, p. 178). All phenomena which had to be given either a positive (present) or a negative (absent) assessment four or more times were designated "general" (*op. cit.*, p. 220). It appeared at the conclusion of the analysis, in which a total of 241 aspects of the types of political organisation under discussion were investigated, that 158, or 65.5 %, could be qualified as general. The distribution of these aspects over the various tables showed the number of general aspects to be significantly higher for some subjects than for certain of the others (*op. cit.*, pp. 309 ff.).⁵

The following subjects had a high "general aspect" rating:

a. Functions of the ruler:	4 of the 4 aspects
b. The ruler's duties:	12 of the 14 aspects
c. The ruler's relatives:	5 of the 6 aspects
d. Court and courtiers:	6 of the 8 aspects
e. Position of regional administrators:	6 of the 8 aspects
f. Duties of regional administrators:	6 of the 8 aspects
g. Position of local administrators:	7 of the 10 aspects
h. Duties of local administrators:	4 of the 6 aspects
i. Agents:	4 of the 5 aspects
j. Courtiers:	7 of the 8 aspects
k. Ritual functionaries:	7 of the 8 aspects
l. Stratification of the population:	3 of the 3 aspects
m. Obligatory services:	5 of the 6 aspects
n. Ritual and ceremonial obligations:	4 of the 4 aspects.

Of the 98 aspects of the above 14 sub-categories that were investigated, 80 turned out to be general. Expressed in percentages this is 81 %.

⁵ The results of the counts reproduced here are the corrected ones. Claessen 1970a, pp. 220, 278, 308. An error in the table on p. 309 has also been rectified here.

The following subjects had low "general aspect" scores:

a. Rules of succession for the ruler:	3 of the 7 aspects
b. Position of the heir to the throne:	2 of the 5 aspects
c. Position of the military leaders:	5 of the 11 aspects
d. Duties of the helpers:	2 of the 5 aspects
e. The taxation system:	2 of the 5 aspects
f. Rights of the common people:	3 of the 10 aspects.

Of the total of 43 aspects which were compared here 17, or the equivalent of 40 %, appeared to be general in this group.

a. Position of the sacral ruler:	17 of the 27 aspects
b. Inauguration of the ruler:	7 of the 14 aspects
c. Women around the ruler:	8 of the 13 aspects
d. Position of the dignitaries of the realm:	9 of the 13 aspects
e. Duties of the dignitaries of the realm:	4 of the 7 aspects
f. The ministers:	6 of the 9 aspects
g. Commoners and the government:	2 of the 3 aspects
h. Status privileges:	2 of the 4 aspects
i. Proximity of the administrative centre:	2 of the 3 aspects.
j. Position of the helpers:	4 of the 7 aspects

The general aspect percentage here comes to 61 %, or 61 of the 100.

The sub-categories of the first group pertain chiefly to the organisation of the princedoms in question, covering the functions and duties of the ruler, and the position and duties of the local and regional administrators. There was also seen to be a high degree of correspondence between the significance of the courtiers and the ritual functionaries — both of which groups are highly dependent on the ruler. The internal stratification of the population as well as the compulsory services and the comprehensive ritual and ceremonial obligations form as it were the key-stones of the organisation.

There is considerable variation in the second group, the rules of succession and, connected with this, the position of the heir to the throne both displaying marked divergence. The position of the military leaders in the African princedoms was seen to be connected with particular religio-magical responsibilities, the resultant pattern thus clearly deviating from the rest. And furthermore, it goes without saying that the scope for variation in the taxation systems and rights of the common people is also wide.

The sub-categories in the third group relate principally to sectors in which a certain degree of variation is possible without doing anything to affect the structure of the organisation or the essential character of the sacral ruler. These include: variation in the aspects of sacrality, variation in the inauguration ceremonies, and variation in the position

of the dignitaries and ministers of the realm. The variation in the position of the helpers is dependent on the degree of specialisation in the different states.

The thus resulting diffusion of the aspects of political organisation enables one to infer that there are a number of "constant" aspects, and another number displaying variations. This automatically leads us to refer to Steward's views. For this author says on the basis of what he discovered in a comparative study of the rise of the state in Mesopotamia and Meso-America that by isolating the important institutions from their specific appearances and abstracting them into types one is then able to use the terms "basic" and "constant". The phenomena giving these institutions their specific form can be qualified as "secondary" or "variable" (Steward 1955, p. 184). This method may also be applied to the data emerging from the analysis of the five princedoms under discussion. Here one might say that each abstracted aspect represents a constant one, while the specific form in which it occurs in each of the separate princedoms is the variable. Thus the aspect of "one of the ruler's wives is the chief wife" is a constant, while the specific form for each state is the variable (Claessen 1970a, pp. 208 ff.). This idea may possibly even be extended a little further still to come to mean that if any random political organisation displays a number of aspects that are found also in the political organisation of other states, these "recurrent" aspects form the constant core, while the remaining ones, which display a high degree of diversity, are the variables. A valid basis for these assumptions may be formed by the 158 aspects emerging as general ones from the comparison of the political organisation of Tahiti, Tonga, Dahomey, Buganda and the Inca realm. The validity of this assumption may be further demonstrated by checking it against other centralised states with a sacral ruler at their head (cf. Krader 1968, pp. 196 ff. on the general characteristics of the state).

Now, it appears that the political organisation of the Inca realm displays in addition to the general characteristics, a number of aspects which are found in none of the four others. These might be termed the "specific" aspects of the Inca political organisation.

The aspects in question are the following (Claessen 1970a, p. 316):

- a. No anarchy prevails after the ruler's death;
- b. The crown prince is required to give evidence that he is in good physical condition on his inauguration;
- c. "Rituals of rebellion" are not encountered here;

- d. The crown prince exercises political influence;
- e. Regional administrators do not fulfil any extra functions;
- f. The ministers' functions are full-time;
- g. Superior status does not make for better treatment in jurisdiction where commoners are concerned;
- h. Living in the vicinity of an administrative centre does not entail any extra risks for the people;
- i. Living in the vicinity of an administrative centre does not involve especially heavy taxation for the people concerned.

In addition several aspects are seen to be more prominent in the Inca empire than in the other four states, viz.:

- a. The criminal law is regulated in greater detail;
- b. Statute labour is more comprehensive and is more precisely regulated;
- c. The bureaucracy is more elaborate.

None of the abovementioned specific aspects is of essential significance for the political organisation. This enables one to draw the conclusion that the political organisation of the Inca empire *does not differ essentially* from that found in any of the four other states.⁶

None of the states of Buganda, Dahomey, Tonga or Tahiti can be termed hydraulic. There are no waterworks of any significance found here. Although Goldman (1970, p. 170) mentions the presence of irrigation works and terraces in Tahiti, the sources do not show these to be on anything larger than a local scale.⁷ We are able to conclude on the basis of the arguments advanced so far that the political organi-

⁶ It should be noted here that the two Polynesian princedoms deviate from the general picture on two points, viz.: in Tahiti there are no local administrators, and in Tonga the ruler's power is not as unlimited as elsewhere. For an explanation see Claessen 1970a, p. 319.

⁷ Banks 1963, I, p. 297, informs us that in the peninsula of Tautira a number of brooks were dammed up with stone walls. Cook 1968, p. 108, confirms this. Taro, the crop most likely to have been irrigated — see Barrau 1961, pp. 18, 24, 40, 42 — is hardly mentioned by Banks, an experienced botanist. Cook does not mention it on his first voyage (1968, p. 120, note 6), while he does speak of it in respect of Tahiti on his third voyage (1967, p. 206). King, in a comparison of agriculture in Hawaii, Tahiti and Tonga (1967, p. 618) says that the Tahitians "leave the hills in a great measure in their Natural state". Bligh, pp. 75 ff., although describing agriculture in Tahiti, says nothing about either irrigation or taro. An indication that taro was planted on moist ground is given by the missionaries of the *Duff* (A Missionary Voyage, p. 375). The missionary W. Ellis informs us (1831, I, p. 43) that taro was an important food crop that was preferably planted on low-lying, moist ground. See further De Bougainville 1966, pp. 207 ff. Archaeological research has not contributed much to the clarification of the picture as regards Tahitian water works either. See: Garanger 1964, 1967, Suggs 1960, and Emory 1933, p. 14.

sation of the hydraulic Inca realm corresponds on all essential points with the political organisation of the four non-hydraulic princedoms. What remains to be determined now is whether Dahomey, Buganda, Tahiti and Tonga possessed a political organisation which developed under the influence of a hydraulic neighbouring state.

As regards the African states, Ancient Egypt should be looked to as the possible source. A detailed analysis of the views of historians on migrations in Africa (Claessen 1970a, pp. 134-140) indicates plainly the extreme difficulty of demonstrating that there were any relations between Dahomey and Buganda on the one hand, and Ancient Egypt on the other. One is regularly forced to skip several centuries and hundreds of miles at a time when trying to follow the thin thread of possible relations. If one is prepared to accept all the hypotheses, the possibility of Egyptian influence can in fact be taken for granted (*op. cit.*, p. 140). If, however, one tries to corroborate this hypothetical relation by adducing the specifically African aspects (*op. cit.*, pp. 314 ff.), there appear to be major differences between the political organisation of Egypt and the two African states.

The following aspects were shown to be specific for Africa:

- a. The ruler is symbolically killed;
- b. The ruler travels about little or not at all;
- c. Physical impediments disqualify a prince as successor to the throne;
- d. The ruler's relatives are in principle excluded from the administration of the realm;
- e. The ruler's wives have certain official aspects;
- f. Regional administrators are not charged with ritual duties;
- g. Military leaders bear the ritual responsibility for war;
- h. Ritual functionaries occupy their offices through hereditary succession;
- i. The position of the local heads is stronger than elsewhere;
- j. Jurisdiction takes the form of palavering;
- k. Defendants have the right of appeal;
- l. Notables are expected to assist their subjects.

The following of these aspects were also found in Ancient Egypt:

- A. Defendants have the right of appeal;
- B. Jurisdiction is characterised by the palaver form;
- C. Notables are expected to assist their subjects.

Some of the above aspects — definitely not the least important ones — were not found in Egypt. For here:

- A. The king is not symbolically killed;
- B. The ruler's relatives are definitely not excluded from government;
- C. Ritual functionaries do not occupy their position through heredity;
- D. Military leaders do not bear the ritual responsibility for war.

Until a satisfactory explanation can be given for the abovementioned differences, we must give up all attempts at tracing the political organisation of the African states back to Ancient Egypt, and instead assume an independent development south of the Sahara. This does not at the same time deny the possibility of Egyptian ideas penetrating to Black Africa.

Although the last word has not been written about the origin and the migration routes of the Polynesians (cf. Goldman 1970, pp. xxiii-xxvii), the outlines hereof are beginning to show increasingly boldly. On the basis of both archaeological (Green 1967, 1968) and linguistic arguments (Anceaux 1965), not only their Southeast Asian provenance but also the theory that the Polynesians' route lay across Melanesia (Cf. Claessen 1970b, pp. 404 ff.) is put forward as a likely assumption. Starting from a set of simple social structures, a political organisation differing but little in structure and function from those encountered in Africa and the Inca empire (Claessen 1970a, p. 311) evolved in some of the Polynesian islands. There are no reasons for assuming that the inhabitants of either Tonga or Tahiti copied their political organisation from other areas — on the contrary, there is every indication that this was an endogenous development (Claessen 1970a, p. 317). Goldman (1960, pp. 701 ff.) ascribes this development to the influence of status lineages. This theory is further developed in his later publication entitled *Ancient Polynesian Society* (1970). It still remains to be seen whether this status lineage theory offers in fact sufficient promise for the explanation of all the developments in Polynesian social organisation. It certainly points to an important factor in this development, however.⁸

By assuming a local Polynesian development, we are rejecting the structural influence of hydraulic states on the political organisation of Tonga and Tahiti. It is out of the question that influences from Hawaii — which Wittfogel regards as a hydraulic state (on which we shall have more to say further down) — had any effect on this, as Hawaii derived its culture from Tahiti and the Marquesas Islands rather than the reverse being true (Claessen, 1970b, p. 405).

We may now assume on the basis of the views advanced above that:

- a. The political organisation of the hydraulic Inca realm and those of Dahomey, Buganda, Tahiti and Tonga are similar to one another in respect of the "general" ("constant") aspects;

⁸ See also: Kirchhoff 1968; Fried 1960, pp. 717 ff.; 1967, pp. 126 ff. This theory does not completely exhaust all the state origin mechanisms. See Krader 1968.

- b. There were no influences from either nearby or distant hydraulic states at work in the development of the political organisations of Dahomey, Buganda, Tahiti or Tonga;

so that we may draw the conclusion that *for the development of this type of despotic political organisation the presence of hydraulic works is not pre-conditional.*

III

The relationship between despots and water works is even vaguer still. For it is possible to demonstrate that in particular states designated as "hydraulic" there is no evident relationship between the water works present and the despotic form of government. This kind of situation is found in the Hawaii Islands, for instance.

Wittfogel (1963, p. 241) characterises Hawaii as a "crude agrobureaucratic hydraulic state". For an analysis of the traditional situation in the Hawaii Islands we should turn principally to the earliest extant literature. For Kelly (1967) demonstrates clearly that the political organisation of the Hawaiian principedoms was profoundly influenced by the recommendations of the British naval officer Vancouver, who paid several long visits to these islands in the years between 1790 and 1795.

Ever since the time the Hawaii Islands were first discovered by Cook in 1778 European visitors have talked about works designed to regulate the supply of water to the crops — especially taro.

Cook himself describes a taro plantation, which he qualifies as a "sunken taro-pit" (1967, p. 269).⁹ King (1967, pp. 521 ff., 608 ff.) gives a description of terraces closed in by low dikes laid out along the mountain slopes, on which taro is planted among other things. In his view the water supply is provided by rainfall. It is also apparent from Clerke's journal (1967, pp. 592 ff.) that the inhabitants of the Hawaii Islands laid out terraces on the mountain slopes. Samwell, Cook's ship's surgeon, wrote (1967, p. 1166) that taro was planted on *dry* soil in the Hawaii Islands.

The journals of Meares (1790, p. 275), Douglas (1790, p. 338) and Turnbull (1806, p. 261) mention only that taro was grown here. Vancouver (1800, I, pp. 240 ff.) gives a fairly detailed description of the taro fields in Oahu, saying that small terraces are divided by low dikes, and the necessary water is supplied from brooks via ditches. In the island of Kauai (*op. cit.* I, pp. 247 ff.) taro was planted on the coastal plain. Here he also came across a wall built across a creek for the purpose of damming up the water behind it.

These same water works were examined thoroughly by the archaeologist Bennet. He confirms the presence of terraces. The size of these varied considerably, as did their construction, but they were all built along very simple lines

⁹ Barrau 1971. Spencer and Hale 1961, pp. 12 ff., are inclined to wonder whether the taro pit is justifiably regarded as a form of terrace.

(1931, p. 20). "Vancouver's wall", the so-called "*menehune-ditch*", is also described by him; he says it is a stone wall built to form a storage reservoir (1931, pp. 22 ff.). In the other islands as well, the presence of terraces is confirmed by archaeological research (Emory 1921, p. 22; 1924, p. 48; 1928, pp. 17, 69; McAllister 1933a, p. 27; 1933b, p. 13).

Descriptions of taro terraces are also given by other early visitors to the Hawaii Islands. Campbell (1818, pp. 95, 106) informs us, for instance, that the terraces in Oahu were well kept, ingenious and small. Von Kotzebue (1821, pp. 29 ff.), furthermore, gives considerable attention to the taro fields. The picture presented by Adelbert von Chamisso (1835, I, p. 124; II, p. 180), Boelen (1836, III, p. 103), and W. Ellis (1831, IV, pp. 60 and 93) does not differ from this.

The memoirs of the Hawaiians David Malo (1951, p. 204), Kepelino (1932, p. 152) and John Ii (1959, pp. 68 ff.) also refer to taro-growing. They open up no new perspectives over and above those already mentioned.

The fact that emerges from all the descriptions is that the inhabitants of the Hawaii Islands mastered the technique of building small terraces, which were flooded with the aid of simple irrigation systems. The opinion of Spencer and Hale, who made a thorough study of terrace-building in general, applies entirely to conditions in Hawaii. They describe them as local constructions dependent on "the activity by individuals or small groups, acting in co-operation but not in centralised schemes" (1961, p. 2).

The surveys of the political organisation of the Hawaiian princedoms given by Goldman (1970, pp. 200-242), Handy (1965, pp. 35-46), Malo (1951, pp. 53-65, 187-200) and Kuykendall (1947, pp. 7-14), supplemented by the observations of King (1967, pp. 509-515), Clerke (1967, pp. 596-598), Ellis (1831, IV pp. 411-419), Kepelino (1932, pp. 122-150) and Wise (1965, pp. 81-91) enable one to form a fairly clear picture of this. A perennial problem is that in the case of the more recent authors it is not always clear whether their descriptions are of the traditional organisation or of phenomena which arose only under the influence of Vancouver or other Europeans (Kelly 1967).

The highly sacral *alii nui* were the heads of the different states. They were assisted in their administrative tasks by the *kalaimoku*, who acted as a kind of general regent. It was one of his duties to divide the land. The *kahuna* was the ruler's advisor on religious affairs. The various districts of the realm were governed by notables bearing the title of *konohiki*. The ruler and these notables could demand goods and services of their subjects with a certain degree of arbitrariness. To satisfy these demands the lower class subjects were obliged to work hard. The question that presents itself, now, is whether there are any indications to be found in the administrative organisation that the government took a hand in the planning, construction and maintenance of water works?

The answer to this question is of necessity negative. Although there are references here and there in the literature to Hawaiians working on the construction of terraces or irrigation ditches on the orders of their lords (such as Handy 1965a, p. 38), there is nothing to suggest anywhere that this kind of activity involved anything over and above the execution of agricultural work on the private estates of the notables. John Ii's story (1959, pp. 68 ff.) according to which "innumerable people" transformed an entire region in a single grand campaign does not ring true enough to be taken seriously, at any rate in that particular form. The essence of the story concerns the work of a group of men on one of the private estates of Kamehameha, where terraces were being built. There is every reason to doubt seriously that what is described here is the execution of hydraulic works projected by the administration — also in view of the context of the report.¹⁰

Thus the administrative influence on the agrarian situation of the former Hawaiian princedoms is seen to be in agreement with the conclusions drawn from the description of terraces.

It can be said on the basis of this analysis of the data on the Hawaii Islands that what we have here is a *despotic political organisation which has no connections whatever with the hydraulic works found there at the same time*.

A similar situation was observed in an entirely different part of the world by the American scholar Adams. His analysis of the earliest Mesopotamian data showed that "there is nothing to suggest that the rise of dynastic authority in southern Mesopotamia was linked to the administrative requirements of a major canal system" (1966, p. 68). The same was seen to be true with respect to the data from Meso-America which he used for comparison. He says in this respect: "No more than in Mesopotamia, and in all probability less, can we look to the managerial requirements of irrigation as the major stimulus to the growth of the institutions of the state" (*op. cit.*, p. 76).

Does all this mean that Wittfogel's assumption that there exists a connection between the presence of irrigation systems and the existence of despotic political organisations should be rejected? Insofar as irrigation works are regarded as the exclusive factor responsible for the development of despotic political organisations, the answer is *yes*.¹¹ That is not

¹⁰ Kamakau's observations, 1964, p. 4, on rulers laying out particular taro fields should perhaps be viewed in the same light.

¹¹ Cf. Popper's views on the falsification of theories.

to say, however, that state interference in hydraulic works is altogether without consequences. It can be regarded as the factor responsible for *intensification of already existing* despotic, bureaucratic and managerial tendencies. This is a development that did in fact take place eventually in Mesopotamia and was probably cut short in the Hawaii Islands. A development, furthermore, that is manifested by the greater number of the officials and rules in the more extensive Andes empire which we observed in the comparison between the Inca State and the four other states.

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Abbreviation: BPBM = Bernice P. Bishop Museum.

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