

COMMODITIES AND “KOGAI” —A FRAMEWORK FOR STUDYING THEIR CAUSAL RELATIONSHIPS—

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1. *Introduction*

At a time when the problem of “kogai”¹ has been issue, the Japan Society of Commodities adopted the topic of “commodities and kogai” as the theme for its 22nd annual meeting held in May of last year. Up to that time there had been little explicit study “kogai” from the point of view of their interactions with commodities.

Because of the complex nature of the problem, it has become evident that a greatly increased amount of research will be necessary to provide an in depth analysis of the causal relationships between kogai and commodities. This paper² will merely provide a framework to clarify some of these relationships and to facilitate further research on this topic.

2. *Discussion*

2-1. Definition of “Kogai”

“Kogai” can be defined³ as an artificial disaster which is produced by the action of a personal or public enterprise and which nearby residents suffer. (For instance, airpollution by smoke or poisonous gas, riverpollution by the draining of industrial waster, ground-sinking by large-scale extraction of subterranean water, noise from machines, etc.)

On the other hand, Law no. 132⁴ defines “kogai” as follows:

1. The production of damage to the health of mankind or the living environment by airpollution, river, lake or seapollution, soilpollution, noise, vibration, ground-sinking and odors which are produced by the action of man or enterprises.

2. The land, animals and plants and their growing environment which are related intimately to human beings are included in living environment discussed in this law.

In the former definition, “kogai” “must be an appearance produced by the action of enterprises” and “thus soilpollution and noise” are not classified as “kogai”. Furthermore, the expression of “and so on” is quite ambiguous.

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¹ Though the term of “kogai” can be translated into English as environmental pollution, environmental disruption, public nuisance or public hazard, the author will employ the Japanese term “kogai” alone.

² This report is based on a publication presented at the 22nd annual meeting of the Japan Society of Commodities.

³ This definition was quoted from the authoritative Japanese dictionary *Kojien*.

⁴ This law was parred in December of 1970.

In the latter definition, "kogai" is damage produced by the action of man, but the danger from food or contaminated tableware are not included.

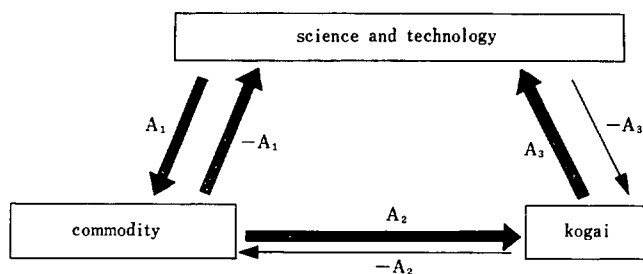
Thus, the author will here define "kogai" as damage produced by the activities of man and having adverse effects on man and his living environment. This definition is rewritten focussing on commodities as "damage to the health and living environment of man resulting from his various activities involving commodities".

2-2. Science and technology, commodities and "kogai"

Progress in science and technology has resulted in both mass production and the output of a great variety of goods, which have, it turn, further stimulated the development of science and technology. Regarding the relations between "kogai" and science and technology, the questions of whether the progress of science and technology produces "kogai" or whether the progress of science and technology can cope with "kogai" are also closely interrelated with each other.

The cause and effect relationships between "kogai", commodities, and science and technology are represented in Fig. 1. Arrows indicate the orientation of the actions, and their thickness shows the relative strength of the actions. The actions are as follows:

FIG. 1. "ACTION CYCLE"



A_1 : the effect of science and technology on commodities; i.e., the effects of science and technology on developing new products and increasing the scale of production of existing ones.

A_2 : the effects of commodities on "kogai";
an occurrence of "kogai" based on a movement of commodity will be contained in this effect. This category will be considered in more detail below.

A_3 : effects of "kogai" on science and technology;
an example would be the stimulation of science and technology resulting from a search for countermeasures against "kogai".

$-A_1$: the effect of commodity on science and technology (the reaction of A_1);
i. e., the action by which the commodity stimulates the progress of science and technology. An example is the developing by an industrial firm of a new technology for its own use. This author has discussed the relations between commodities and science and technology in a previous work.⁵

$-A_2$: the effects "kogai" on commodities (the reaction of A_2);

⁵ H. Kataoka, "Technical Progress and Quality of Commodities", *Business Review*, Vol. 19, no. 1, p. 47, (1971).

i. e., the action by which "kogai" changes a quality of a commodity. The changing of the quality of gasoline by decreasing the amount of lead tetraalkly compound is in this category.

— A_3 : the effects of science and technology on "kogai";

i. e., the action by which the technology developed by the action A_3 eradicates the "kogai".

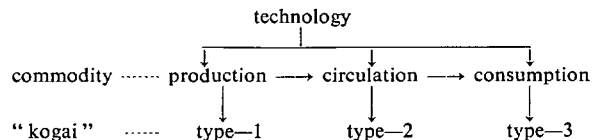
From this "action cycle", it becomes clear that science and technology, commodities and "kogai" have important effects on each other. The actions ($-A_2$ and A_3) drawn with the thin arrows are typical ones in this cycle. It means that these actions are weak both quantitatively and qualitatively, and lack in positiveness. So, the stream of clock-wise revolution of this cycle is not smooth. This phenomenon is explained as follows: in the action by which the science and technology works upon the "kogai" and eradicates it and by which the "kogai" acts on the commodity and removes the "kogai" from it, the actions which requires development of a new commodity not producing "kogai" and which needs the technology for the banishment of the "kogai" are contained. These actions are disadvantageous for the pursuit of profit, and there is thus little natural incentive for such actions.

2-3. "kogai" accompanied with the life of commodity

The general reactions between commodities and "kogai" have been examined together with the relation of science and technology above. And now, through the stages in the life of a commodity (production → circulation → consumption) the relations between them will be discussed.

A commodity is produced in a factory and is passed through a circulating process, and then is consumed. The various "kogai" result from one or more of the stages in this process of commodities. These relations are illustrated in Fig. 2.

FIG. 2. THE "LIFE-CYCLE" OF COMMODITIES AND THE TYPES OF "KOGAI"



The "kogai" produced throughout the lifetime of a commodity are classified in three types: the "kogai" occurring when the commodity is on the stage of production, circulation or consumption and are designated as "kogai"-type-1, "kogai"-type-2 and "kogai"-type-3, respectively. The commodities producing each of these types of "kogai" are termed com-type-1, com-type-2 and com-type-3, respectively. This classification of the three types of "kogai" and commodities is shown in Table 1.

The origin of type 1 "kogai" is in the production stage. Examples are the damage by the efflux of cadmium from a zinc refinery, river or seapollution by discharges from a paper mill and airpollution from iron manufacture. It is characteristic of this type of "kogai" that the change is not caused by the zinc, paper or iron itself, but rather by the shortcomings of their industrial technology. Ground subsidence resulting from the large-scale extraction of subterranean water or natural gas should also be included in this category. This type of "kogai" can be eliminated, at least theoretically, by the improve-

TABLE 1

"kogai"	commodity	type
type-1	com-type-1	
type-2	com-type-2	
type-3	com-type-3	{ A: disused type B: consumed type

ment or alteration of the production process. One example of such an alteration is to eliminate the discharge of wastes by converting the production process into a closed system.

Type 2 "kogai" occurs at the circulation stage of a commodity. An example is seapollution by the outflow of crude oil from a damaged tanker. One type of partial solution that has been developed is the dividing of the cargo into small compartments in order to minimize the outflow. Another related example of this type of "kogai" is seapollution resulting from the cleansing of the tanker with detergents after the oil has been unloaded.

Type 3 "kogai" occurs at the consumption stage. Commodities producing this type of "kogai" may be divided into type A (or "disused type") which is transformed into "kogai" after it has fallen into disuse as a commodity and type B (or "consumed type") which is converted into "kogai" at the time of its consumption. The cause of type B can be considered as a part of the quality of this type of commodity. That is, the negative utility existing in a quality may produce the "kogai", and is designated as the "quality of disutility" here. Examples of type A are plastics and nuclear fuels which do not decomposed and cannot be easily destroyed after use, and examples of type B are gasoline by use of which carbon monoxide or lead are emitted from internal combustion engine and an agricultural chemicals polluted a soil or milk.

Petroleum produces sea and air pollution at the stages of circulation and consumption, respectively. This is an example of one commodity producing two different types of "kogai". Further, it is clear that the controvesial point of milk polluted by the agricultural chemicals is not with the milk itself but rather in the property of the chemicals. The existance of the "quality of disutility" in the "primary quality" (most important quality in commodity) will cause this phenomenon.

3. Conclusion

The relations of commodity, "kogai" and science and technology have been explained by using the "action cycle". And it has been made clear that "kogai" result from the various stages of commodities, and that "kogai" can be conveniently classified into a few general types. Furthermore, it is presumed that a certain quality of a commodity ("quality of disutility") would produce a "kogai".

Some qualitative relationships between "kogai" and commodities have been studied herein in preparation for quantitative treatment of these relationships to be presented at a future date.