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DEVELOPMENT OF PANCASILA AS SCIENCE ETHICS: STRATEGIES TO OVERCOME NEGATIVE IMPACT TECHNOLOGICAL DEVELOPMENT

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Abstract

This research is a reflection of concern over the negative impacts that are increasingly prevalent due to the development of science and technology (IPTEK). To overcome these negative impacts, scientific ethics are needed that can build ethical behavior in the development of science and technology in accordance with the culture of the Indonesian nation. The purpose of this study is to examine the development of Pancasila as a scientific ethic. This study uses a philosophical phenomenological method that is supported by library reference sources and authentic observations. The results of the study show that the development of science and technology requires scientific ethics. Pancasila fulfills the requirements to be developed as a scientific ethic, because all of the Pancasila precepts are an organic unity, contain basic values that have long been believed to be guidelines and even the Indonesian people's view of life, contain basic values that shape the character and behavior of the Indonesian nation, namely religious, humane, nationalist, democratic and just.

Keywords: Keywords: Pancasila; scientific ethics; development of science and technology; the Indonesian nation.

Pendahuluan

If the application of science is really a means of liberating humans from the backwardness experienced around 1800 - 1900 by providing know-how and technology skills that enable humans to earn their own living without relying on capital owners, then the opinion that science must be developed on the basis of principles the rules of science itself (purely) and do not need the intervention of other rules, will not receive sharp criticism as in this century (Sutardjo, 1992:5). As stated by Francis Bacon quoted by The Liang Gie, that the real and legitimate goal of the science is the endowment of human life with new inventions and riches. The Liang Gie, (2004: 96).

Science and technology has now entered various aspects of human life. As in social phenomena where human life is increasingly integrated with technology, the space for human movement is regulated by a grid of technological forces. Humans have almost lost their existence as subjects of technology control (The man behind the Gun), now technology has been able to create space for human life (Widisuseno, Iriyanto, 2013: 9). For example, through the transformation and implementation of digital technology, a technological device called the artificial intelligence (AI) has been created. This digital technology is not only able to facilitate the needs of human life, but is able to change the world order and the new norms of modern human life, namely changes in living habits in a real world order with all conventional norms into a

virtual world that is practical, efficient and economical.

The technology of computing machines is growing smarter, but sometimes the human intelligence that is used as a model is actually tricked by artificial intelligence, causing a shift in intelligence. Is artificial intelligence really as smart as we think? Alan Turing, Charles Babbage, John Von Neumann, and Konrad Zuse are the main inventors of the computer. Alan Turing is one of the most influential figures in the field of theoretical computer science and a pioneer in artificial intelligence. His 1950 paper entitled "Computing Machinery and Intelligence" is a source of interesting philosophical reflections on the concepts of intelligence, machines, and thinking. Turing attempted to ask the question can machines think? (Can machines think ?).

Before answering that question, he defined first what is a machine? and what is it thinking ? However, the result is the same as the efforts of many people before, there is no definition that can fully capture the essence of 'mind' as well as efforts to define 'consciousness'. Turing finally shifted to the question of how do we test whether a 'machine' can really be 'thinking' and 'intelligent'? To answer this Turing needed the help of an experimental game. He calls it the term 'The Imitation game' or in general the Turing test. If a machine can pass the Turing test, then we can say that a machine can think, or we can say that the machine is intelligent. But until now, in 2022 there has not been a single engine that can pass the Turing test. Katarina Zweig, Professor of computer science and scientist in the field of socio-informatics, warns against taking the word intelligence in terms of artificial intelligence literally. "What we have today is machine learning," says Zweig. Machine learning is like statistics with more computational power (statistics on steroids). We can use it in many ways, from providing shopping recommendations to self-driving vehicles, but no truly intelligent machines. When we talk about intelligence there is a relationship with consciousness.

The main problem with researching human consciousness is that it is unobservable. It is radically different from science in general, which has a positivistic style. However, there is now agreement that the problem of consciousness is a serious scientific problem. In addition, many researchers believe that they only need to continue to examine the physical structure of the brain to find out how they produce consciousness (Philip Goff, 2019). In the study of the philosophy of mind branch of modern analytic philosophy, we understand nal term qualia, namely subjective conscious experience. Qualia is an unusual term for something very familiar to us, namely how things look from our point of view (Daniel Dennett, 1988). How humans experience qualitatively, for example, seeing a red apple tastes different from seeing a green apple. It is the quality of these experiences that gives them their distinctive 'feel'. So the question is, can AI form and feel qualia? Accessed from: Ahmad Mustafid (2022)

This phenomenon shows that the meaning of intelligence as possessed by humans cannot be replaced (irreplicable) or interpreted by the word intelligence in terms of artificial intelligence (Artificial Intelligence) literally. At this time of transformation and implementation of technology today requires ethical awareness of scientists in the development of science and technology. Responding to this turning point in the evolution of

science, there is a growing need for ethical principles of science that can be used as a common guide in the formation of a culture of scientific ethical behavior for scientists, and stakeholders related to the development of science and technology. This study aims to reveal the ethical values of Pancasila as a scientific ethic. The objective reason is that Pancasila contains the basic values of life that have been rooted in and become a guide in people's daily lives, manifested in the outlook on life and ideology of the Indonesian nation. The values of Pancasila in their objective capacity will be easily accepted by society if they are developed as scientific ethics in Indonesia.

Research Method

This research is a qualitative research with library data sources supported by authentic observation data and relevant documents. Methods of data analysis using the method of philosophical phenomenology. The first step is data collection, namely an inventory of empirical data in the form of the phenomenon of the negative impact of the development of science and technology among the people of Indonesia. The types of data used in this study include secondary and primary data. Primary data obtained from the main literature sources and empirical data that are authentic and relevant. Secondary data is supporting literature data used to support research activities (Kaelan, 2005). After getting the data, then doing reflection as a step in the data processing process. The next stage is critical analysis, to find the root of the problem or the target object that needs to be formulated how to solve the problem. The methodological elements of this research include: perception, interpretation, rationalization, synthesis, and idealization. Perception is done to find the data, then interpretation to reveal the meaning behind the data. Followed by rationalization to find a logical relationship between the meaning of a data, then synthesize it so that there is a unified whole meaning. Finally, idealize the processed data, to build an alternative concept for the solution to the problem under study. The alternative concept of the solution is the development of Pancasila as a scientific ethic.

Result and Discussion

Definition of Ethics To define the meaning of the word ethics is not easy, because the scope of its understanding is very broad, and the meaning contained in the term ethics is not limited to a person's rational understanding but is more influenced by the mindset adopted by a person as a reflection of his feelings and the basic values of his beliefs. If in the literature there are many definitions of ethics given by the experts, it is not surprising anymore. Understanding ethics must be able to capture the essence of the views of experts. Etymologically the word ethics comes from the Greek "ethos" and "ethikos". Ethos means the nature, character, customs, habits, a good place. Ethikos means decency, civility, or good behavior and deeds. The word "ethics" is distinguished from the words "ethics" and "etiquette". The word ethics means a collection of principles or values relating to morals or values regarding right and wrong held by a group or society. The word etiquette means procedures or customs, manners and so on in a civilized society in maintaining good relations with fellow human beings. Meanwhile, in terminology, ethics means knowledge that discusses

good or bad or whether human behavior and actions are right and at the same time highlights human obligations. (Abd Haris, 2007:3).

Ethics in the true sense is a habit, but gradually the notion of ethics has changed as it is now. Ethics is a science that discusses the problem of human actions or behavior, which can be judged good and which can be judged bad by showing human deeds as far as the mind can digest (Istighfarotur Rahmaniyah, 2010: 58). In simple terms, the notion of ethics refers to honesty and mutual trust between a person and other people or institutions in society. The ethical system provides a stable climate for all human activities. This climate provides an understanding that we all live by the rules and laws in a living system (Evelyn 1976: 1.6).

Another expert opinion states that ethics is the science of morality. This means, that ethics discuss ethics scientifically. Morality is the whole rule, rule, or law that takes the form, command or prohibition. In other words, morality instills obligatory and dharma. Therefore, morality regulates human behavior and society. Because decency regulates behavior, humans cannot do things on their own, or don't do anything. Every behavior is regulated or determined by moral norms (De Vos, R., 1987: 3-4).

In the educational encyclopedia dictionary, it is explained that ethics is a philosophy about values, morality about good and bad. In the dictionary of educational and general terms it is said that ethics is part of a philosophy that teaches nobility of mind (Asmaran, 1999: 6). While the word 'ethics' in the big Indonesian dictionary citing the opinion of Bertens (2000), the word ethics has the following meanings: (a) Knowledge of what is good and what is bad and of moral rights and obligations (morals); (b) A collection of principles or values relating to morality; (c) Values regarding right and wrong held by a group or society. So in principle ethics are rules, norms, rules, or procedures that are commonly used as guidelines or principles of an individual and community group in carrying out actions and behavior so that they can be judged good.

An action may be judged as good or bad, the action seems to come out of a human being that is carried out consciously of choice, or in one word: intentional. The absolute conscientious factor necessary for a good or bad judgment, is called an ethical and moral judgment. So the material object of ethics is humans and the formal object is human actions that are carried out intentionally (Poedjawiyatna 1982:13-15). Having understood what ethics means, then what has changed the circumstances of the application of ethics and where is its important position for science? At least it is realized in the development of science and technology, ethics of science is very necessary. Then, what is the essence of scientific ethics?

Definition and Scope of the Problem of Scientific Ethics Thinking about the ethics of science indicates that there is public unrest in the development of science, there have been humanitarian problems that are detrimental to human life. At the beginning of the development of science with its various discoveries and applications it never caused problems for human life, and at that time no one had a problem with the ethics of science. Science at that time was developed based on its own scientific principles, without the intervention of rules outside of its knowledge. Science develops for the purpose of advancing science itself,

selflessly for other interests outside the interests of science, focusing on maintaining objectivity in its development goals. Science in its development is value-free. The Greek scientists wanted science to be selfless. In the process of discovering its concepts, science always upholds the truth, so that truth is upheld as a value. The truth will be pursued purely and put aside values that will color the strings attached in carrying out scientific processes other than the goal of obtaining the truth of the science (Melsen, 1985: 85).

So initially science was neutral, after science was developed and applied for certain purposes the development of science was no longer neutral. When entering the modern age, science is no longer neutral in its development, many authorities interfere in the development of science for purposes outside of their knowledge. Now it can be understood that the source of the problem of the negative impact of the development of science and technology is users, technologists, bureaucrats and stakeholders. Now people are feeling the negative consequences arising from the development of science and technology. How ethics can be applied in all scientific activities, so that the results of scientific development in the form of technology can raise human dignity from underdevelopment. The idea of scientific ethics as an effort to overcome the negative impact of scientific developments.

Science and technology cannot be separated from the history of the development of Natural Sciences (IPA). The term science at the beginning of the modern century signified a period of progressive development of science coloring its era, through various findings of new theories and technologies. From the 18th century to the end of the 20th century, the history of science, particularly the physical and biological sciences, was often presented in a progressive narrative in which true theories replaced false beliefs (Golinski, Jan (2001). The term science comes from the Latin ” scientia", meaning knowledge. In the Big Indonesian Dictionary (2022) explained, the meaning of the word science is systematic knowledge obtained from an observation, research, and trial that leads to determining the basic nature or principle of something being investigated and studied. Science is a collection of empirical, theoretical and practical knowledge about the natural world produced by scientists that emphasizes the observation, explanation and prediction of phenomena in the real world (Quoted from: https://id.wikipedia.org/wiki/Sejarah_sains)

The characteristic of scientific methodology is a systematic knowledge that always conducts observations, research and experiments in every effort to find the basic principles of scientific truth or theory and technology. So, the initial emergence of the term science was intended to conceptualize the family of empirical sciences, and in its development science gradually initiated the birth of technology (17-19 centuries), so that at the beginning of this modern century the term Science and Technology (IPTEK) emerged.

Then what is the meaning of scientific ethics, namely ethics applied in various scientific activities so that every scientific behavior towards science which includes observation, research, scientific experiments, theory or technology discovery and its use can be accounted for ethically and humanity. Why is that, because the ethics of science is closely

related to the responsibility of humanity. The understanding of the responsibility for scientists is not only limited to the obligation to develop and practice the concepts, theories of science and technology, but also to consider the possible changes that will occur as a result of the application of science and technology. So, understanding the ethics of science requires an awareness of academic and social responsibilities. The practice of scientific ethics requires individual awareness to do things as they should from the facts (das Sollen) not just what they are, what they can (das Sein). The ethics of science involves the consideration of values in every scientific behavior, to complement the results of rational considerations. The ethics of science requires that every scientific behavior in the treatment of science must maintain honesty and respect for fellow colleagues (Widisuseno, Iriyanto, 2017, 15).

Scientific ethics in practice includes various research activities, publication of research results and the use of technology results, professional practice and management of science and technology management. The task of science ethics is to provide rational considerations about ethical dilemmas related to research and the application of science (Dua, M., 2011). The ethics of science also directs that every human being in science has good moral integrity, such as being honest, respecting the work and thoughts of others and avoiding plagiarism. Violations of scientific ethics by scientists in carrying out research and including submitting proposals, carrying out, analyzing data and reporting the results of their research, will cause ethical problems and even legal cases in society (Quoted from: Harry Firman)

The Urgency of Science Ethics

If the application of science really fulfills its original purpose, namely to free humans from the backwardness experienced around 1800 - 1900 by providing know-how and technology skills that enable humans to earn their own living without depending on capital owners, then the opinion that science should be developed on the basis of the principles of science itself (puritanism), there is no need for intervention by other rules, it will certainly not receive sharp criticism as has happened in this century (Sutardjo, 1992:5). In the opinion of Francis Bacon quoted by The Liang Gie, the real and legitimate goal of the science is the endowment of human life with new inventions and riches (The Liang Gie, 2004: 96). Science actually contributes to human life through new discoveries in the form of technology.

Actually, science is neutral, what makes it useful or harmful is humans, decision or policy makers, including scientists, politicians, entrepreneurs, and users. The negative impact of the application of science that humans face today is rooted in the misuse of science (Firmansah, 1989). The Indonesian people must appreciate the results of scientific and technological progress through smart and wise management and use of technology. However, the current facts behind the positive side of modern technology are dilemmatic, or paradoxical, problems, namely on the one hand technology facilitates all the needs of human life, on the other hand there is a negative impact due to the way technology is used, encouraging the development of a

technocratic society, such as emerging patterns of people's lives. pragmatic, practical, and positivistic orientation. The social culture of people's lives is getting dry from the spirituality of ethical and moral values. Social norms are always measurable as far as the mind can accept.

The impact is that there is a change in attitude in some Indonesian people, namely the weakening of community commitment to the overall core values which have long been a guideline and even a way of life, making the philosophical system of the Indonesian nation vulnerable to disorientation and distortion of values. Old values that used to be seen as something noble and used as guidelines are now considered old-fashioned or outdated, while people turn to modern cultural values that are practical and pragmatic oriented, not necessarily all of their values are in accordance with the value system of society that reflects their personality. the Indonesian people (Widisuseno, Iriyanto, 2017:15). Another phenomenon is the tendency of specialization which is accompanied by the findings of each technology that pushes science to achieve its autonomy. Things that need to be a concern in the stage of scientific autonomy, every scientific development demands further developments that cannot be rejected by humans, for example in the following developments of the empirical sciences.

a. Nuclear Physics and Chemistry: has been able to produce nuclear weapons manufacturing technology on a large scale. Physicists now consider not a weapon, but in fact a destroyer (destroyer, annihilator) because it kills or mistreats humans en masse and destroys global ecosystems in a short time.

b. Chemistry: has succeeded in making new compounds on a large scale in the form of drugs for diagnostics, therapy for various diseases and disorders, as well as poisons to eliminate living things that harm humans. However, in the end, the opposite always happens which is beneficial to be detrimental. Poison for living things is also used for humans. Poison gas and psychotropic drugs are used as weapons in war. Ironically, these ingredients can change personality, meaning a pollution of the I. This kind of case is a violation of very fundamental human rights.

c. New biology: has brought the technology of reproduction and genetic manipulation to living things. Both have fundamental consequences, namely human manipulation by humans. On the negative side, this technology reduces diversity, increases production costs and creates new varieties and organisms whose behavior in the ecosystem is not well known. It can change nature, destroying family concepts and the boundaries of beginning and end of life. On the positive side, the technology can increase the quantity and quality of food ingredients including plants and livestock, and even create new organisms. In humans he can measure the number of offspring through the desired traits in offspring (Yacob, T., 1988:14-15).

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According to Yacob (1988) there are still results from the development of other empirical sciences that are no less important, such as:

a. Genetic engineering (biotechnology) and micro electronics. All of this can be detrimental to human existence and culture if science is allowed to develop freely apart from the basic framework for strengthening the existence of science (ontology, epistemology, axiology). In addition to the specific problems mentioned above, there are general trends in the development of science and technology that need to be considered because they affect human life, for example: anti-human, or disturbing the balance between individuals and society and their environment. Some of the trends in the development of the empirical sciences are as follows.

b. Bureaucracy and Technocracy. The management of technology that is increasingly developing and high requires a large and increasingly centralized bureaucracy. Furthermore, the specifications and the resulting fragmentation cause not everyone to know about a problem in depth, so that experts experience increasing dependence and give rise to technocracy and ekspertocracy. They give instructions, advice, and choices to decision makers, who then have to take responsibility for it, but do not control the whole issue. This raises various ethical issues.

c. Nature's Exploitation peaks Due to the increasing demand for materials with more consumption and equipment, exploitation will peak even more. Likewise, the tools of exploitation are growing, multiplying, and entering all fields and sectors of life. The world of machines urges humans in the space of work and entertainment. It demands a different way of working than that which suits man.

d Experiment The development of science and technology requires experimentation both in the laboratory, the environment, human individuals, populations and animals. For reasons of scientific objectivity, in experimentation scientists are often trapped in their scientific autonomy, forgetting to consider rules outside their scientific rules. The results of his experimentation are only in the form of objectivity of the truth of knowledge which cannot be applied for the benefit of human life. In fact, it only harms human life.

e. Emancipation of Space and Time Science and technology are quite successful in liberating humans from space, but they are not completely successful in liberating humans from time. Modern work forces humans to try to escape from time with various pathological consequences. The empirical evidence wants to clarify that science does have autonomy. The autonomy of science certainly cannot and should not be meant that scientific research, or

experimentation, need not be concerned with any outside scientific value. Scientific research or experiments in addition to adhering to the rules or scientific values themselves must also pay attention to values or rules outside the scientific rules, for example moral-ethical, religious and cultural norms. For example, ethical considerations prohibit experiments on humans, no matter how much scientific information can be obtained from these experiments (Yacob, T., 1988: 40-41).

The above phenomenon shows that science is entering into quantum evolution which has the potential to reveal new ecological zones and niches for humans. If the process and direction are wrong, this evolution can end in the extinction of the human species. (Yacob, T., 1988: 20). In a critical period of development of the empirical sciences as it is today, scientific ethics are needed to accompany the progress of science, guide scientists and professionals through various forms of science and technology development activity programs. In particular, the ethics of science forms the mentality and personality of professional scientists who prioritize intellectual freedom while respecting differences of opinion, so as to prevent a person from fanaticism and narrow dogmatism. The ethics of science provides the basis for value judgment in the research, application and development of science. Giving direction so that the scientific process maintains scientific methods that lead to the achievement of the ultimate truth, scientific behavior must maintain honesty (Iriyanto, 2013:13). Can science and technology develop value-free? Thomas Khun & Michael Polanyi stated that scientific knowledge is never neutral, but always grows in social, personal, economic and political contexts (Suriasumantri, 2009: 12).

Principles of the Development of Science Ethics The target of developing scientific ethics is how scientific ethics can function effectively to encourage and provide space for the development of science and technology for the advancement of society without destroying the cultural values of the Indonesian nation. For this reason, there are several principles that need to be considered in the development of scientific ethics, such as the following.

a. Authentic: that the basic values that form the basis of scientific ethics are really extracted purely from the culture of the people themselves. The community already feels ownership, scientific ethics is easily accepted by the community because it has a strong cultural foundation root, is able to adapt technology because scientific ethics is integrated with people's daily lives.

b. Universal: considering the plurality of Indonesian society, the scientific ethics formula must contain the essence of universal ethical values, in the form of basic ethical values that can be accepted by all community groups, as a representation of the interests of all groups, community groups.

c. Progressive: change due to globalization is a necessity, even that change will determine the existence of the nation so as not to be left behind in the midst of global life. The formulation of scientific ethics must be designed in such a way as to be able to adapt and anticipate the dynamics of the times.

d. Objective: there is no element of tendentious interest for certain parties, neutral for the common main goal, scientific ethics developed on behalf of all parties to lead to substantive goals. e. Unity without fragmentation: maintaining identity in every diversity is important, because each diversity needs existence, but the unity of universal principles in scientific ethics must be remembered in the context of plurality, in order to maintain unity without division (Widisuseno, Iriyanto, 2021: 22)

Pancasila Formulation as a Scientific Ethics. Adhering to the principles above, to build scientific ethics in Indonesia, we imperatively put the basic values or the Pancasila paradigm for the development of science and technology. Referring to Thomas Kuhn's view, the meaning of paradigm describes a whole concept with theory, postulates, teachings and even "views of life" as the basis and direction for the development of science and other strategic policies (Van Peursen, 1987). Pancasila meets the criteria as a paradigm, because it contains basic values that unite the nation's view of life, as a value orientation for basic law, contains the ideals of living together, tested for its strength by history. Scientists and related parties are required to understand the values of Pancasila as a whole, in depth, and critically in order to capture ethical values as a whole.

The role of the values of each Pancasila precept as a scientific ethic to overcome the negative impacts of the development of science and technology is as follows.

a. Ketuhanan Yang Maha Esa: complementing knowledge creates a balance between the rational and the irrational, between reason and taste. This precept places humans in nature as a part and not at the center.

b. Kemanusiaan yang adil dan beradab : giving direction and controlling knowledge. Science is returned to its original function, namely for humanity and not only for certain groups or layers.

c. Persatuan Indonesia : implementing science as a means to unite in a pluralistic society while continuing to develop the values of Indonesian nationalism.

d. Kerakyatan yang dipimpin oleh kebijaksanaan dalam permusyawaratan/perwakilan: balance the autodynamics of science and technology as they evolve freely. Experimentation

in the application and dissemination of science must be democratic and can be discussed in a representative manner, from policy, research implementation to mass implementation.

e. Keadilan sosial bagi seluruh rakyat Indonesia : implementing social justice must maintain a balance between individual and community interests, because individual interests should not be stepped on by the public interest. Individuality is the basis that allows participation, creativity and innovation to emerge.

The application of the Pancasila science ethics must be understood as an integrative unit of ethical values contained in the Pancasila precepts. Systemically, the Pancasila science ethics teaches that the development of science and technology must lead to the achievement of the highest levels of community life that are religious, humane, nationalist, democratic. and fair. Ethics requires a change in approach and methods. This shows that ethics is advancing dynamically and ethics as stated by Magnis-Suseno (1999), does not function to build new moral attitudes, but makes people more critical, not simply submit to whatever is put to them, and, provide theoretical tools so that existing moral consciousness can be rationally directed; because indeed a critical-ethical attitude cannot arise by itself (Bertens, K., 2001:103).

The application of Pancasila science ethics in the development of science and technology must maintain the validity and reliability of science that can be accounted for, both based on scientific principles (context of justification) and based on the prevailing value system where science and technology are applied (context of discovery).

Conclusion

The progress of science and technology in Indonesia is currently influencing fundamental changes to various aspects of human life. The development of science and technology will continue throughout the course of human life. Since the beginning of its development science and technology is neutral, it is humans who make goals outside of the interests of science and technology so that the results of their development cause paradoxes and side effects that are detrimental to humans. No matter how high technological progress is, it will not benefit human life if in its design, development and use it does not adhere to scientific ethics. If the process and direction are wrong, this evolution can end in the extinction of human existence. At a time when the development of science and technology is experiencing a crisis period as it is today, the scientific ethics of Pancasila is very much needed as a guide, guiding the process and determining the direction of the goal. Pancasila qualifies as a scientific ethic, because all the values in Pancasila are a complete and systemic unit, contain basic values that unite the plurality of society, as an orientation to the Indonesian nation's view of life, and have been tested by historical experience.

Scientists and intellectuals are required to understand Pancasila as a whole, fundamentally, and critically. The development of science based on the

Pancasila science ethics must maintain the validity and reliability of knowledge that can be accounted for, both based on scientific principles (context of justification) and based on the prevailing value system where science and technology are applied (context of discovery).

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