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The Hamas Movement: Ideology vs. Pragmatism

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Abstract

This study aims to present the Hamas Movement, its ideology and pragmatism. With progress and modernization, the Islamic movements in the Middle East realized that they could not deny progress, so they decided to join the mainstream and take advantage of technological progress in their favor. The movement maintains at least one website in which it publishes its way, and guides the audience. Although these movements seem to maintain a rigid ideology, they adapt themselves to reality with the help of many tools, because they have realized that reality is stronger than they are. In conclusions: the rise of the Islamist movements as a leading social and political force in the Middle East is the result of the bankruptcy of nationalism, secularism and the left in the Arab world, which created an ideological vacuum, which is filled to a large extent by the fundamentalists, ensuring that Islam is the solution. It is not only about the extent of the return to religion, but about the transformation of religion into a major political factor both by the regimes and by the opposition. These are political movements that deal first and foremost with the social and political mobilization of the masses, and they exert pressure to apply the Islamic law as the law of the state instead of the legal systems taken from the Western model. Islam is a belief rooted in the consciousness of the masses and deeply ingrained in Egyptian culture. In Israel, the situation is different, modernization and democracy also affects Israeli Arabs. Therefore, it is possible that Islam is not so deeply rooted in the culture of the Arab citizens of Israel, they are aware of the possibility of a different path other than Islam. The movements have developed over time tools that enable them to cope with reality. The religious law in Islam allows flexibility in organizing community life, Shari'a is adapted to reality because of the ruler's ability to canonize legislation and flexibility in political life according to principles such as sabra and long-term goals, to compromise with reality and find temporary solutions, as well as religious scholars who provide fatwas and commentaries on every subject.

Keywords: Hamas Movement, Palestinian Authority, Israel, ideology, pragmatism.

1. Introduction

Hamas operates in the Palestinian Authority territories in Gaza and the West Bank. The Palestinian Authority is a semi-autonomous political entity that dominates the Palestinian population in Judea, Samaria and the Gaza Strip. Until 2006, the Palestinian Authority was controlled by PLO and Fatah members, and in January 2006 elections were held for the

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Palestinian Legislative Council (PLC), which held most of the council's seats prior to the elections, and for the first time its main rival, the Hamas movement. The Hamas movement won 76 seats against only 43 seats, and Hamas' victory marked its transformation into the leading political force among the Palestinian population in Judea, Samaria and the Gaza Strip.

In January 2005, after the death of Yasser Arafat, Mahmoud Abbas, Abu Mazen, was elected to the post of chairman of the Palestinian Authority, and also to his replacement as Chairman of the Executive Committee of the PLO, ie the head of the PLO. Haniyeh.[1]

Today, the security control of the PA in Judea and Samaria is undermined by the corruption of the Fatah regime. The PA has lost much of the control, and the Gaza Strip is subject to anarchy and the chaos of various gangs. The population is in the middle between PA chairman Abu Mazen and the Fatah movement, and on the other side is the Hamas movement that currently controls the Gaza Strip, and we are witnessing attempts to pressure Hamas to develop a kind of pragmatism to create a dialogue with Israel. In the meantime, the PA is deteriorating to all levels, from the social, economic, employment, and political spheres.

2. The status of religion in the government and the society

Most of the Palestinians are Muslims, mostly Sunni Muslims, and the minority are Christians.

Since the beginning of the days of the Palestinian Authority, the government has been ostensibly secular, because the PA was controlled by the Fatah movement. But it can be seen that the PA has over the course of time imparted many religious characteristics to the population. The image world of the Fatah movement is apparently Muslim in order to bring the religious population closer to its path.

The basic premise on which the Oslo Accords were based was that the Israeli-Palestinian conflict was not a total religious conflict, but a dispute over border lines that could be resolved. But PA clerics, who are members of the political leadership, preach in public and over the airwaves that the Israeli-Palestinian conflict is part of an eternal war between Muslims and Jews. The Jews are portrayed as the enemies of Allah, and the killing of Jews is presented as the will of God. On the political level, Allah forbids accepting the existence of Israel, and it will put an end to its existence.

The Palestinians have redefined the conflict from a conflict over borders, a compromise that could be the way to solve it, a religious war for Allah, where compromise is heresy. The religious view of the PA is expressed in the Friday sermons and religious lessons broadcast on Palestinian television, usually so that the Jews are the enemies of Allah. There is an eternal religious war of Islam against the Jews. The killing of Jews is a religious duty. The Palestinians are the spearheads in the war against the Jews. Islam must help in this war[2].

All the land of Palestine between the river and the sea is an Islamic sanctuary, a Muslim who gives up part of this land has inherited hell. The agreements with Israel are temporary and signed as a result of the balance of power that temporarily tilts in its favor. Allah will replace the Muslims who neglect the commandment to fight Israel, in others.

All these were expressed in the Palestinian media during the days of Arafat, and even today. This view is very religious, and very similar to Hamas'. It is not clear whether this stems

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[1] Brown, Nathan J. (2003), *Palestinian politics after the Oslo accords: resuming Arab Palestine*, University of California Press.

[2] Forbes, Andrew, and Henley, David, *People of Palestine* (Chiang Mai: Cognoscenti Books, 2012).

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from a true religious outlook or whether it is intended to inflame hatred. "The Day of Resurrection will not come until the Muslims fight against the Jews until they hide behind the stone and the tree and say the stone and the tree: Oh Muslim, Abdullah, there is a Jew behind the coming and killing him"

In 2001, a preacher on Palestinian television attacked the leaders of the Arab-Muslim world for refraining from attacking Israel with missiles and tanks, threatening them that "Allah could replace them with other people … who are fighting for Allah … to liberate the land from the uncleanness of the Jews."

It should be noted that this message that the Israeli-Palestinian conflict is a religious conflict has often been said by PA-appointed clerics, well before the outbreak of violence in October 2000. The preaching is not a response to the wave of violence, Israel as temporary, and the war against the Jews as Allah wishes, contributes to the ideological basis of hatred and acts of violence against Israelis.

Hamas has a special site for children al-fateh.net (the occupier) praising violence, and death for Allah is defined as victory. The death of terrorists as shaheeds in attacks against Israel is presented to children as a joyous event.

Islamic movements such as Hamas and Islamic Jihad claim that all "Palestine" is a Muslim Waqf, Christian women in Gaza must wear a veil because of their fear of the extremists, and the last store that sold wine in Gaza was bombed, even though it was owned by the international organizations.

The Fatah-controlled Palestinian Authority has many Muslim characteristics, from the introduction of Muslim symbols into official Fatah documents, Arafat's statements, and to the Palestinian media at the time. In the days of Hamas, it is reasonable to assume that the spirit will be even more religious, since it is controlled by a religious movement.[3]

3. The status of the legal system

In order to understand the powers of the government and the law, it is necessary to understand that the Palestinian political arena is polarized and decentralized. The most common distinction among the components of the Palestinian leadership is the distinction between "old guard" and "young shift." This division mainly overlaps the division between "internal" and "external," since the establishment of the Palestinian movement there has been no "generational change" in the leadership.

The movement that was supposed to serve as the "ruling party" and to organize itself accordingly remained an amorphous movement whose public support was mainly the nature of a utilitarian relationship with the PA and its apparatuses, but not accompanied by ongoing mobilization, organization, and ideological discussion.

These complaints, which intensified since 1996-1997, focused mainly on the corruption of PA leaders, the poor state of security regarding the preservation of life and property, the violation of human rights, and the arbitrariness and arbitrariness of the judicial system and the enforcement of the law in the event of internal conflicts and the need to protect the weak. This situation is often seen as a result of the proliferation of security mechanisms, their thuggery behavior, and the total absence of coordination between them. The great fragmentation in this area is seen as responsible for prolonged detention without trial and human rights violations and the phenomena of blackmailing businessmen and forced cooperation between them and the

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[3] Rothstein, Robert L. (1999), *After the peace: resistance and reconciliation* (Illustrated ed.), Lynne Rienner Publishers.

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security services, which often represent local and sectoral interests, that is, family. The complaints about the unchecked corruption of Palestinian personalities and institutions and the fierce competition between them over financial resources are reinforced by the paucity of poor services provided by the Palestinian Authority in the social and economic spheres. In fact, there is a continuous regression of the authority from involvement in various areas of life of the population as a result of limitations in the resources at its disposal, but also as a result of the preference for using those resources arbitrarily and according to standards of loyalty and closeness and not according to established procedures or objective needs.

An examination of the centers of power in these arenas should apply to all circles of leadership and control: the traditional families and the economic elite, the various organizations, and individuals of a unique status in the eyes of the Palestinian public. Now that Hamas is in power, there is still not enough information, but it is likely that more Muslim figures will appear in the PA's judicial system, and the status of religion will also rise[4].

4. Theoretical background – The theory of Pragmatism

Pragmatism is a philosophical theory that was raised in the United States at the end of the 19th century. Its founders were Charles S. Pierce, who gave the theory its name and developed its principles: William James, who promoted and disseminated it, and John Dewey, who developed the instrumental aspects of the theory.[5]

The theory of pragmatism is a philosophical idea that emphasizes the connection between theory and practice: the value of the truth of theory depends on the organization and the effectiveness of its application. Pragmatism, says Richard Rorty, is about what are the most effective ways of achieving what we want to achieve.[6]

Pragmatism holds that the truth is measured by practical purposes. The truth of a claim is determined by practical results and the benefit it serves. Pragmatists rely on empirical experiments and practical success and rejecting a-priori assumptions as a source of human knowledge (espousing empiricism). According to pragmatism, thoughts, ideas, and outlooks are merely tools for achieving one's life goals - and have no metaphysical significance.[7]

That is, concepts represent appropriate thinking habits or etiquette; they do not represent metaphysical truths and do not describe the nature of things. Language is not only a means of communication but an expression of the world's consciousness and worldview. Knowledge is guided by the interests and values of users. The subjects establish themselves in a process of empirical experience, rather than as a result of rational and theoretical inquiry.[8]

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[4] Watson, Geoffrey R. (2000), *The Oslo Accords: international law and the Israeli-Palestinian peace agreements* (Illustrated ed.), Oxford University Press.

[5] Bacon, M. (2012), *Pragmatism*, Oxford: Polity Press.

[6] Brandom, R. (2011), *Perspectives on Pragmatism: Classical, Recent, and Contemporary*, MA: Harvard University Press.

[7] Kloppenber, T. J. (1996), Pragmatism: An Old Name for Some New Ways of Thinking? Source: *The Journal of American History*, Vol. 83, No. 1 (Jun., 1996), pp. 100-138. Published by: Organization of American Historians.
https://oconnell.fas.harvard.edu/files/jameskloppenberg/files/pragmatism_old_name_for_new_wayas_of_thinking.pdf.

[8] Menand, L. (Ed.) (1998), Pragmatism, New York: Random House.

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5. The ideology of the Hamas movement

The name Hamas is the acronym of Harqat al-Muqawama al-Islamiyya (Islamic Resistance Movement). The movement was established shortly after the outbreak of the intifada in 1987.

Since Hamas is deeply rooted in Palestinian life, "speaks its popular language, is sensitive to its local customs and collective image, shares its religious desire, expresses its traditional values, and is attentive to its daily needs and existential difficulties."

Hamas is a Palestinian Fundamentalist Islamic movement founded by Ahmad Yassin as a religious movement for the sake of the community, and because of the sensitivity that the movement reveals to the needs of the population, it brings many supporters in the name of Islamic faith.

The movement has a political wing that frees messages of Palestinian national value, even though its ideological base is theological-Islamic, conservative and fundamentalist. The movement promotes the idea of territorial nationalism, claiming that this is a stage on the way to Islamic suits. According to her, the state is a framework within the whole, and ideas of nationalism can be promoted as part of the promotion of Islam as a whole. According to the Hamas charter, Article 12, nationalism is connected to the land and is part of the religious faith, and Hamas claims that there is no contradiction between the two, and thus legitimizes Islamic nationalism. In fact, Palestinian nationalism is being appropriated in favor of Islam.

Hamas also has a military wing that works to establish an Islamic Palestinian state instead of the State of Israel, since the center of faith is armed struggle against Israel, and a war based on the principles of religion, namely, Jihad.

There is also the civilian wing that performs welfare activities for the residents, such as operating clinics, giving charity, distributing food, and maintaining schools, and through these welfare activities it mobilizes supporters. Political Islam, of which Hamas is a part, seeks to ensure that the laws of Islam govern all aspects of life, namely, Islamic education, Islamic economics, and Islamic life. Hamas aspires to reform society in the spirit of Islamic values.

The Hamas charter presents the ideology of the Hamas movement as it was shaped and formulated by its founders. The document contains a radical Islamic worldview, which is the school of the Muslim Brotherhood in Egypt, which has not changed in the 18 years since the movement's establishment. With regard to Israel, the covenant expresses an uncompromising position that views Israel as a religious Muslim problem, and in the conflict with Israel a conflict between Islam and the "infidels". The territory of Palestine is presented in the Covenant as an Islamic holy land, and it is strictly forbidden to waive any of it because no one has the authority to do so.

Hamas targets are derived from the objectives of the Muslim Brotherhood because it is an Islamic movement, but the new concept is the integration of the Muslim faith into the Palestinian national struggle. Hamas claims that the State of Israel is an artificial entity created by flawed colonialism. In Hamas's view, all the land of the Land of Israel is sacred Islamic land, a Waqf land, which should be under Muslim rule. Hamas wants to establish a Palestinian Islamic state over all of Mandatory Palestine. The residents who live on the Holy Land will live as a minority in the Palestinian Islamic state on the condition that they recognize the rule of Islam and live as an inferior minority. In order to achieve its goals, Hamas advocates the use of Jihad, a war of justice, a struggle for power, in order to transfer all infidels. Palestinian Jihad According to Hamas, it means a violent struggle against Israel or any other foreign force that controls Palestine, and in the framework of Jihad, Hamas' clerics also give religious sanction to acts that are forbidden to Muslims, such as suicide bombing attacks, Women and children in the war.

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Da'wah is a charitable activity, social assistance and education, and in fact training hearts for the return of the Palestinians to the fold of Islam. This activity brings the Palestinian people closer to Islam and provides popular support for Hamas' ideological views. The Da'wah fits in with Hamas' desire to create an Islamic state with popular support by social change, rather than by a violent coup that forces Islam on the people.

Through Jihad and Da'wah, Hamas is maneuvering, with constant attention to the range of chances and risks facing it. The methods used by Jihad and Da'wah are constantly changing, according to the political situation in which Hamas operates.[9]

6. Hamas maintains four main principles:

(1) Denies the existence of the State of Israel because it is an artificial entity created by defective colonialism. Therefore, the movement does not take steps that imply that it accepts Israel's existence or accepts its future existence. As a result, Hamas will act to wage a violent struggle against Israel, while denying the possibility of renouncing the weapons of the resistance. However, it can be seen that since the beginning of the tahideh, there have been differences of opinion among Hamas leaders regarding Israel and the actual struggle, and there are those who support a cease-fire to postpone the struggle and indirect negotiations with the State of Israel without recognition of Israel. Hamas's political platform is considered more moderate than the basic principles of the movement.

(2) Hamas does not accept the possibility of establishing a secular state identified with the PLO unless it is a step towards the establishment of an Islamic state. From which it derives its ideas, concepts, and understanding of the universe. Hamas emphasizes the Islamic aspect of its activities, and thus draws the Palestinian people closer to the interpretation it gives to Islam.

(3) Hamas cooperates with the other Palestinian forces, since they are part of the Palestinian resistance, and therefore seeks to avoid a civil war. Despite her opposition to secular development, she views her as a partner. "The father, the brother, the rest of the flesh and the friend," is what the PLO calls the Hamas charter.

(4) Another important principle that gives her patience in her activity is the sabra, which means patience and perseverance. Hamas understands that the goals are not attainable in the short term, so the effort must be long-term. This is, in fact, Islamic patience, which speaks of exploiting opportunities only when possible, and until then preparing the ground. This principle is very important to the pragmatist line of the movement. A principle that goes hand-in-hand with the Sabra is the patience required to train the hearts, in effect, the gradual seizure of power by preparing the ground or the patience required for tahadiya, which is usually used as a lull to restore the forces.

Due to the growing corruption in the Fatah movement, Hamas aspires to have a clean image in the eyes of the Palestinian population. Thus, it increases its support and legitimacy, so in most of its moves, the movement takes great sensitivity to internal public opinion and tries not to confront it or bring it into situations of uncertainty. Hamas is able to recruit supporters among the Palestinian community for its public image, as a defender of Islamic values, and Palestinian nationalism for concessions and capitulation to demands and dictates by Israelis.

Hamas creates an alternative system of services available to that of the Palestinian Authority, which makes it very easy to recruit supporters. It can be seen that Hamas is involved in all the various services in the community, as well as the development of an extensive military

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[9] Matthew Levitt (2007), *Hamas: Politics, Charity, and Terrorism in the Service of Jihad*, Yale University Press.

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network, and its increasing involvement in politics until most of the Palestinian street elects to serve in parliament, point to the fact that the movement is pragmatic and adapts itself to time, even though it is not a religious movement. Behind absolute truths, and collective salvation in one way, and adapts itself to the social framework by being attentive to the needs of the population, to the economic and political framework.[10, 11]

7. Does Hamas imply Pragmatism in their political activity?

The PLO had the hegemony in the Palestinian political arena, and the growth of Hamas to the point of competing for public support, setting the agenda and controlling the institutions and the bases of power was challenging and surprising for the PLO.

When Israel neglected civilian services in the territories and deepened settlement policy, Hamas focused on building networks of social infrastructure and civilian services, along with building a religious identity. In addition, Hamas objected to the declaration of the establishment of a Palestinian state that could harm the unity of Islam on both sides of the Jordan River, so that Hamas drafted an alternative treaty, published as a basic document in August 1988, about eight months after Hamas was established. Unlike the Palestinian Charter, which is formulated in legal language, the Hamas charter is formulated as sacred and eternal principles and cannot be changed.

The convention established the casting of Palestinian national ideas into the world of faith and concepts of Islam. The land of Palestine is an Islamic sanctity, and indivisible. This is a transition from an Islamic ideology to a national territorial concept. The contradiction between a national idea that sanctifies state sovereignty and a divine law was settled by defining the national struggle in religious terms.

The most significant part is the administration of Jihad against an enemy that tramples on Muslim soil, for Jihad is the only solution to the conflict. Jihad is the personal duty of every Muslim, and any political solution to the conflict is an act against Islam. The Palestinian problem is an Arab-Islamic and not a secular national issue. Three circles are committed to liberating Palestine, first and foremost the Palestinian people, then the Arab states, and the Islamic world.

According to the charter, Hamas is prepared to accept the PLO's burden if it adopts Islam as a way of life, and emphasizes the common national aspect and joint struggle in Israel for the same purpose, even if the PLO remains a secular movement. Hamas aspires to a central political and moral position while striving for long-term strategic goals alongside immediate and practical goals.

The goal was to turn the political and social alternative into the PLO, and therefore a change in the response to the entire Palestinian community was required, ie, shifting from the bottom of an Islamic society to a political action plan, objectives, and means. Become focused on a specific territory and community, and Hamas mobilizes support from the Fatah support groups.

With the PLO's declaration of a Palestinian state in October 1988, Hamas refrained from attacking the PLO, even though by definition this was only part of Palestine, but with regard to further concessions from the Palestinian Authority, Hamas issued a counter-opinion.

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[10] Joshua L. Gleis, Benedetta Berti (2012), *Hezbollah and Hamas: A Comparative Study*, Johns Hopkins University Press.

[11] Mishal, Shaul; Sela, Avraham (2006), *The Palestinian Hamas: Vision, Violence, and Coexistence*. New York: Columbia University Press.

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Hamas recognizes the limits of its power. Therefore, it adopts a policy of non-acceptance and rejection of issues that are incompatible with its principles.[12]

8. How does Hamas promote national Palestinian interests while still adhering to the Islamic ideology? How does Hamas decide between the religious imperative and reality on the ground?

The agreement between Israel and the PLO, and the establishment of the Palestinian Authority in 1994, required Hamas to be flexible in its attitude towards Israel, which would have allowed the continuation of community activity and strengthening its standing in society, but Hamas would have lost its uniqueness as an opposition fighting for the center stage. The adherence to the religious example and the opposition to the peace process would have undermined Hamas' status, and the principle that guided Hamas in dealing with these dilemmas was the ability to justify the need for a religious example, in a political and official dialogue Cooperate with the PLO as the right action, using the military option from time to time.

The triangular relationship between Hamas, the PLO and Israel, and in effect the separation between a long-term vision and short-term goals and objectives, were resolved by integration into PA institutions and the use of controlled violence. Thus, a combination of basic principles and current political interpretation is expressed.[13]

9. How does Hamas justify the difference between Islamic religious law and decisions in the current reality?

Hamas has behavioral strategies and methods of action that allow activists to live with internal contradictions over time without being defeated by them, even though the movement is fundamentalist and religious, it combines political realism.

The absence of a central religious authority in Islam, along with flexibility in matters of interpretation, creates behavior that is sometimes seen as a moral value, defined by Meshal and Sela as a "dynamic reserve," that is flexible borders and constant negotiations that enable cooperation with existing regimes. Understood that such a way would be beneficial to her, the other side also had needs and norms of behavior, which could eventually lead to compromise.

Over the years, the movement's movements can be seen in accordance with the environment, the Palestinian Authority and the Oslo process on the one hand, and on the other hand, the confrontation with Israel and the middle of the Palestinian population. Hamas operates within a complex framework that dictates ambivalent behavior that combines ideology with reality. The movement manages to be flexible within the complex reality, so that its principles will be preserved.

On the one hand, the movement waged a holy war against Israel, supported an armed struggle, and wanted to establish a Palestinian state over all of the Land of Israel. On the other hand, there are mechanisms of compromise. It allows for a hudna, a temporary cease-fire, or a truce.

Hamas refuses to recognize the legality of the Palestinian Authority on the one hand, while Hamas' members have many operational mechanisms, especially in the local authorities. In

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[12] *Hamas and the Terrorist Threat from the Gaza Strip. The Main Findings of the Goldstone Report Versus the Factual Findings*, Intelligence and Terrorism Information Center.

[13] Roy, Sara (2011), *Hamas and Civil Society in Gaza: Engaging the Islamist Social Sector*, Princeton, NJ: Princeton University Press.

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addition, there is a partnership in the Palestinian parliament, until in the last elections Hamas received most of the seats in parliament.

According to Shaul Mish'al and Avraham Sela, this is a combination of flexibility and conformity: An Islamic movement with a unique national identity and communal interests, a hierarchical organization alongside local leadership based on personal relations, rhetoric of religious zealotry and interpretation that justifies compromise and pragmatism.

The movement has influence in the Palestinian arena, and therefore has responsibility for the Palestinian population, and since January 2006 it has also been in control of the Palestinian Authority and has governmental responsibility, so it must adopt a more pragmatic worldview in order to achieve clear goals for improving the lives of the population.[14]

10. How do these conflicts affect Hamas' behavior?

Hamas is nourished by an Islamic worldview with clear lines. Every deviation requires justification for the movement, the Palestinian population, the clerics, the Fatah movement and even Israel.

Hamas is committed to the extent of the Muslim Brotherhood, both of which have a universal Islamic concept, i.e., an apocalyptic aspiration to share the Islamic states under one Muslim rule according to the past and the regime of exchange. But Hamas adopted another line, Palestinian nationalism that ostensibly contradicts the idea of Pan-Islam.

There is tension between a religious and national worldview and its continued existence as an organization and its public strength, and an additional tension between adhering to the idea of Islam, the war against Israel and the consideration of internal Palestinian political considerations and Israel.

We must understand that according to contemporary political Islam scholars there are two main approaches. The revolutionary approach, which maintains that the society will be assimilated by concentrating efforts to seize power, in effect, is the realization of the goal from the top down, while the reformist approach holds that the establishment of an Islamic state will be possible through gradual and continuous social and political activity.

We can see how both approaches influenced Hamas' activity. Most of the Islamic movement supports the rejection of violent acts against Muslims, but Muslim violence against non-Muslims is possible, especially the conflict against Israel, especially after Israel's invasion of Lebanon in 1982, when the ethos of Muslim recruitment against the enemies of Islam again arose. The Jihad for the protection of Islamic lands was once again presented as the top priority.

Sheikh Abdullah Azzam was one of those who adopted the radical interpretation of the individual's Jihad against non-Muslims stealing Islamic lands. This is in fact the protection of all Muslims, and he even tried to formulate his opinion in Fatwa. But the mainstream among Palestinian Islamists, who espouse Jihad, has given priority to Jihad against Israel with Palestinian national emphasis. The main stream of the Muslim Brotherhood in Gaza adopted a reformist line against violent action, since Israel agreed to Islamic education and the establishment of a social and religious infrastructure under their leadership. In fact, until the intifada, they preferred inner Jihad within the Muslims than an external Jihad against Israel.

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[14] Gunning, J. (2007), Hamas: Harakat al-Muqawama al-Islamiyya. King's College London, in Heiberg, M., O'Leary, B. & Tirman, J. (Eds.) (2007), *Terror, Insurgency, and the State: Ending Protracted Conflicts*, University of Pennsylvania Press.

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During the 1980s, more frequent battles, accompanied by violence, began against Fatah and other secular organizations. After the expulsion of the PLO from Lebanon, it was decided that infrastructure should be prepared as an alternative to the PLO, which was nearing an end. In 1987 there was a trend of young people to engage in armed activity against Israel, which led to the establishment of the Islamic Resistance Movement. When the Intifada broke out, it was feared that it would lead to a loss of influence. The establishment of the Islamic Resistance Movement reflected recognition of the need to adapt to a new reality, a belligerent reality on the Palestinian street, and a compromise between the reformist line and the activist revolutionary line. With the expansion of the Intifada, Hamas was adopted as an integral part. The establishment of Hamas gave legitimacy to Jihad that allows both national and Islamic redemption. The tension between Hamas and the PLO increased and became a contest for determining the Palestinian agenda.[15]

11. What are the mechanisms that allow flexibility and pragmatism to exist?
How does Hamas justify actions that do not conform to its principles?

Hamas operates in complex circumstances, on the one hand, a confrontation with Israel, and on the other hand, Hamas is facing Fatah, which it has refused to join, and in such a situation it must adopt a sensitive policy that is sensitive to its changing conditions.

Hamas is maneuvering among the various elements within the framework. We can see Hamas' flexibility in terms of means of struggle, but it is completely dogmatic about its goals.

The hudna and its rebirth are the main options that allow the movement to compromise. In August 2003, Hamas agreed to a cease-fire for a limited period of time. At that time Hamas removed some political pressure and took advantage of the time for political and military rehabilitation.

Hamas carried out a similar move at the beginning of 2005, when it agreed to the tahdiyya, a lull arrangement initiated by Mahmoud Abbas, while maintaining the right of response.

Islam is a political religion that does not distinguish between religion and state. It is a system of commandments and rules for the behavior of the believer and the many. Today, Islam has a clear political character, since the organizations and movements that were established have a radical world view. The values of Islam allow them to mobilize masses, thereby ensuring public support. Religious belief dictates behavior in the political arena, and the interpretive framework enables them to adapt themselves to reality and time. Fatwa, a religious ruling as a political tool, allows for mass, rapid distribution reaching a wide audience. Fatwa is a religious opinion given by a religious scholar, a person familiar with Muslim law, and is instrumental in interpreting Muslim texts. Fatwa is important for the development of Islamic law, and adapting it to changing time conditions in all areas, especially in the modern era, because of the possibility of regulating radical changes in the Muslim world. Fatwa is, in fact, halakhic argumentation, not a binding interpretation, and its validity derives mainly from the recognition of the authority of the mufti. If the fatwa is accepted by one generation of halakhic scholars who did not dispute it, then the agreement is unanimous, Agamma, and then it becomes a binding rule.

Due to the religious authority and the great popularity of the muftis, fatwas have a great influence on public opinion and on issues on the political agenda. The problem arises when the mufti has no Islamic legal training or training, and he still has influence over public opinion.

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[15] *Hamas Rule in Gaza: Three Years On*, Yezid Sayigh, Crown Center for Middle East studies, March 2010.

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Religion and state in Islam are one and the same and cannot be separated. Politics served religion from the beginning of the spread of Islam, since it is a political act of unification and confrontation with the opponents. From the days of Muhammad, there was a balance of power between the suit, the political leader, and the cleric who interpreted the religious imperative and the law determined by the Prophet.

According to Sami Zubeida, the political field is an ideological and political arena in which various forces operate and compete with each other for power and resources, and the religious elements are an integral part of the political arena, as they engage in organizing, recruiting, propaganda and struggle.[16]

12. How does Hamas rationalize modern ideas of their actions and political activity with religious interpretation?

It can be seen that the stronger Hamas is, the more political it is, and the adoption of modern ideas of action, such as the establishment of political bodies and institutions, and participation in existing institutions. All of these depend on the possibility of creating an interpretation that will be appropriate for action. The more the movement enjoyed charismatic leadership, the easier it was to justify political activity based on religion.

Hamas is careful not to describe the relationship in the political arena as removing the opponent from the political arena, because this is wishful thinking for the long term, it prefers to play the rules of the game and to acquire strength and strength along the way.

Religious law is based on the Koran and the Oral Law, so there is a wide opening to interpretation. This interpretation varies according to the issue and according to the circumstances, and the interpreter himself. In the public arena there is a broad opening to interpretation, interpretation can be designed in a manner consistent with the interest group, and thus halachic scholars give it halachic validity.

Hamas represents a national religious line, opposite which Fatah represents a secular national line. Fatah, which led the Palestinian Authority a short while ago, adopted a political idea and took over a small area of Palestine. Hamas refuses to adopt this line, since the movement is interested in receiving all of Palestine through the armed struggle.

Hamas aspires to bring about a social revolution and then to establish an alternative Islamic order by educational and communal activities that will bring about the correction of the Muslim individual. This is therefore a long-term goal that requires a gradual process of preparing the hearts and returning society to Islam.

There is a tension between the considerations of a declared commitment to a war against Israel and current considerations of maintaining public achievements and political status, while ensuring access to material resources and other resources of power and influence. Far-reaching flexibility is liable to undermine Hamas' credibility, undermine its standing among the population, or create confusion and uncertainty among its supporters. On the other hand, far-reaching adherence may leave Hamas out of the game. It can be seen from Hamas' key decisions that there is a trend to maintain a delicate balance and a combination of final goals and immediate interests and current needs.

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[16] Webman, Esther (1994), *Anti-semitic Motifs in the Ideology of Hizballah and Hamas*, Project for the study of Anti-semitism, Tel Aviv University.

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Hamas demonstrated flexibility and adaptability to the reality of the distinction between a short-term practical goal of a Palestinian state in the West Bank and the Gaza Strip and the long-term vision of establishing an Islamic religious state throughout Palestine.

Hamas regards any political settlement with Israel as a temporary state in Islamic history, which helped it develop tactical flexibility without losing its political credibility.[17]

13. How do Hamas maintain an uncompromising image vis-à-vis the supporters while maintaining and expanding existing achievements?

Hamas' political behavior is characterized by a policy of adjustment and adaptation to circumstances, controlled violence with co-existence through negotiation, and conditional participation, which are ways to avoid a decision between conflicting obligations. On the one hand, confrontation with Israel and with the Palestinian Authority, on the other hand, is an adaptation to and acceptance of the political reality. There is a discovery of political realism and pragmatism, a declared failure to accept, and a complete rejection of the agreement between Israel and the Palestinian Authority following Oslo. Despite the mismatch of the peace process or its results, Hamas has avoided a violent confrontation with the Palestinian Authority, recognizing its inferiority vis-a-vis the PA security forces.

Until Hamas appeared, the PLO took precedence in the Palestinian arena and in the international arena as a representative of the Palestinians, and Hamas remained in a position of inferiority vis-a-vis the PLO and therefore avoided any frontal confrontation at any cost. After the signing of the Oslo Accords and the establishment of the Palestinian Authority in Gaza and Jericho, the risk of a violent confrontation was liable to lead to political destruction and damage to Hamas' image in the eyes of the public. Hamas has learned that preferring a pragmatic approach to adherence to final goals brings it public support. In order to communicate with the population, since its inception, Hamas has been distributing pamphlets since 1987, unequivocally speaking to Israel, that there should be no negotiations on Palestinian soil, with the help of harsh anti-Semitic statements. But on the other hand, in the media, Hamas is raising other solutions, such as a bi-national state, because Islam is a religion based on justice and equality, and Hamas is ambivalent and ambiguous, so that in the future it will be able to compromise.

Sheikh Yassin made it clear in the past how to relate to moderate statements by Hamas: "I take such positions that the other side cannot accept and in such a way succeeds in forcing him to say no, without me having to refuse"

Another example is that in March 2006, Channel 2 News interviewed Snoar, head of the Hamas Shura Council. Hamas has a number of councils in Shura, in the West Bank, in Jordan, and in prisons. Now the Shura, which is in Israeli prisons, is the most influential. Prime Minister Haniyeh, consulted with them frequently and responded to their consultations. Snoar usually refuses to be interviewed, but he makes an effort and interviews the Israeli media, in order to promote his ideas among the Israeli public as well. In my opinion this is clear pragmatism, since before the interview, he received the senior officials' permission to be interviewed. It is reasonable to assume that he was elected, also because he is a senior, but also because he is a screenwriter and has fluent English.

During the interview there is a feeling that the tone has changed since Hamas is in power, the political vision is more practical, and the public opinion in Israel and the world is taken

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[17] Halevi, Jonathan, D. (4 August 2014), *The Hamas Threat to the West is No Different from ISIS*, Jerusalem Center for Public Affairs. Retrieved 25 August 2014.

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into consideration. He says that there is a need for a long-term hudna with the Israeli public, and the supreme aspiration is for the hudna to be passed on to future generations.

In our region a temporary solution is sometimes the most permanent.

14. How do the movement structures and the connection between them enable Hamas to operate in situations of tension and conflict with the PA and Israel?

Hamas uses Islamic values, such as the Sabra, which allows patience, as an ideological justification for deviating from the principles of religion, and thus enjoys moral support. Patience is expressed in the distinction between a final status agreement with Israel that has been rejected altogether, and a temporary arrangement that will allow the struggle to be renewed in time. The value of "sabra" is raised as a means of halachic interpretation that provides maneuverability.[18]

15. Conclusions

The rise of the Islamist movements as a leading social and political force in the Middle East is the result of the bankruptcy of nationalism, secularism and the left in the Arab world, which created an ideological vacuum, which is filled to a large extent by the fundamentalists, ensuring that Islam is the solution. It is not only about the extent of the return to religion, but about the transformation of religion into a major political factor both by the regimes and by the opposition. These are political movements that deal first and foremost with the social and political mobilization of the masses, and they exert pressure to apply the Islamic law as the law of the state instead of the legal systems taken from the Western model. The Islamic solution offered by these movements has several distinct advantages over others. First, Islam is presented as a comprehensive system that provides all solutions to the problem of this world and the next. Second, the Islamic solution is presented as an alternative to the realization of Arab and Islamic revival and power. Ideas of Islamic movements tend to be inclusive, which increases their attractiveness. They are radical in that they seek seemingly profound solutions to the fundamental problems of society. Third, it is not an imported solution. The Islamic solution is an authentic one, rooted in local culture and suited to local conditions.

Islamists also use Da'wah to convey their message. In addition, the voluntary activity of the Islamic movements brings them closer to the general public, especially those in need of social services, education and medicine, and places the Islamic societies in an important position of influence. In the depression surrounding the alleys of poverty, Islam appears as a new hope and the slogan "Islam is the solution" does not require proof. The Islamic movements' main concern is traditional educational activity aimed at preserving and strengthening the character and Islamic character of society. One example of this is the Muslim Brotherhood movement in Egypt at the beginning of its path, which took the approach that the path to achieving the goal, i.e., the establishment of an Islamic state, is a gradual one, emphasizing the Islamic education of the younger generation. How can we explain the fact that the Islamic movements join the government and usually operate within the framework of the law? Most of the Islamic movements in the Arab countries are persecuted by the regime, so they must recognize reality, otherwise the government will not allow them to exist. Islam is a belief rooted in the consciousness of the masses and deeply ingrained in Egyptian culture. In Israel, the situation is different, modernization and democracy also Faffect Israeli Arabs. Therefore, it is possible that Islam is not so deeply rooted in the culture

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[18] Yosif Mahmoud Haj-Yahis; et al. (2009), *Alleged Palestinian Collaborators with Israel and Their Families: A Study of Victims of Internal Political Violence*. Harry S. Truman Research Institute for the Advancement of Peace, Hebrew University of Jerusalem.

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of the Arab citizens of Israel, they are aware of the possibility of a different path other than Islam.[19] Every movement as radical as it may be, tries to adapt itself to the changing realities and conditions, since their leaders know that without any support from the government, it will be difficult for them to exist.[20]

The movements have developed over time tools that enable them to cope with reality. The religious law in Islam allows flexibility in organizing community life, Shari'a is adapted to reality because of the ruler's ability to canonize legislation and flexibility in political life according to principles such as sabra and long-term goals, to compromise with reality and find temporary solutions, as well as religious scholars who provide fatwas and commentaries on every subject.

With progress and modernization, the movements realized that they could not deny progress, so they decided to join the mainstream and take advantage of technological progress in their favor. Each movement maintains at least one website in which it publishes its way, and guides the audience. Although these movements seem to maintain a rigid ideology, they adapt themselves to reality with the help of many tools, because they have realized that reality is stronger than they are.

Note: The article has been updated. Its first version was previously published in the *Interdisciplinary Journal for Israel Studies* (2017), which is no longer active today.

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[19] Chukov, S. V. (2018), Political and philosophical discourse on the border between the Caliphate and terrorism – ISIS, in T. Vasileva & V. Chukov (Eds.), *2nd International e-Conference on Studies in Humanities and Social Sciences – Conference Proceedings* (pp. 59-74), 21 December 2018, Belgrade, SERBIA. https://doi.org/10.32591/coas.e-conf.02.05059c.

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Manufacture of Gilded Threads in the 15-17th Centuries

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Abstract

Since ancient times, gilded threads have been used to decorate textiles in different cultures around the world. In the article, the author examines the threads manufacturing in the 16-17th centuries in Europe and Western Asia, trying to answer two, as it seems to him, the main questions: what was the method of gilding and what was the method of cutting if width error was less than 10 μm. It is assumed that the main gilding method was the diffusion one, and the main cutting method used rollers and a sharp blade at a small angle. The first one has not been proven but the second has been proved. The article lists all marks, diffusion and adhesion coefficients, human angular resolution, and much more.

Keywords: gilded threads, diffusion gilding, cutting into strips.

1. Introduction

Gilded threads (golden, fil d'or, goldfaden) are strips of metal used either in the form of a separate thread, or twisted in a spiral (spin) around a silk core (Figure 1). Since ancient times, metallic threads have been used to decorate textiles. There are metal threads in every museum where textiles are exhibited. Typical thread widths were 130-420 μm with thickness 3-15 μm in the 15-17th centuries. Substrate metals are copper, copper alloys and silver. The edges of the threads are straight and almost without traces of the instrument (a trace remains, of course, but a few micrometers). Some of the threads are gilded on two or one side. For some reason, gold threads were more popular in French, in German, etc., but not in English.

The author studied the characteristics of the threads from both literary sources mainly (see references) and samples provided by Ms. Vasilyeva. The last ones were cut from the 15-17th centuries textiles from Iran, Turkey, Crimea and Russia, but it is impossible to answer which threads were imported or made in the country of origin.
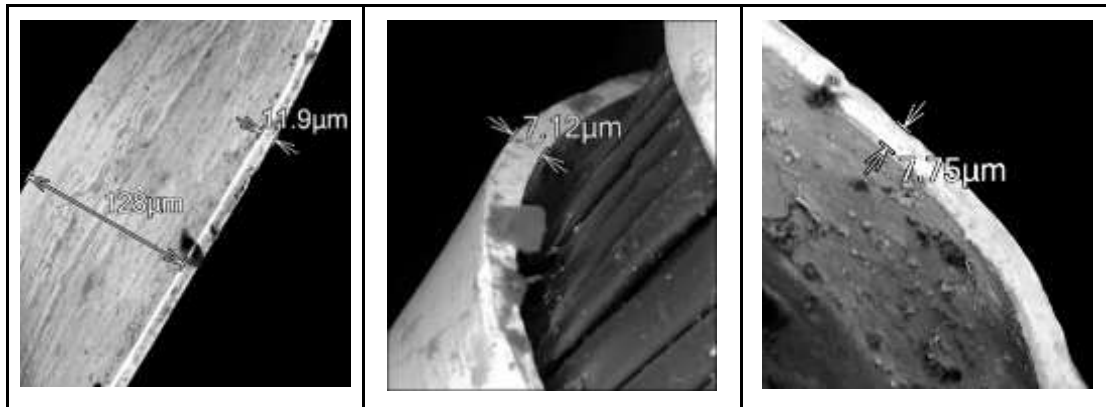
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Figure 1. Samples (5-10 µm) of thread

As it seems to the author, the study of manufacturing techniques should answer two questions first of all: the method of gilding the threads and the method of cutting along. Unfortunately, there are not too many ancient texts. This is first of all "De la Pirotechnia"' by V. Biringuccio (1540) (Biringuccio, 1990), "Essay des Merveilles de Nature et des plus Nobles Artifices" by E. Binet (1632) and much later "Die Entwicklung des Maschinenwesen und die Frauenarbeit" by A. Schwarz (Schwarz, 1928) and "Nordisk guld spinding og guldbroderi i den tidlige middelalder" by S. Larsen (1939) (Larsen, 1939).

V. Biringuccio in his very cognitive book "De La Pirotecnia" drew how two goldsmiths forge a gilded sheet of silver (Figure 2). The sheet will then be cut into strips and used to produce gold, spin as it was called, i.e., will be twisted in a spiral around the core. Biringuccio writes that it was "women who are much more patient than men" who knew how to cut into narrow strips with long, flexible and sharp scissors, as long as the length of a strip of gilded silver. Note that the word "scissors" (forbici) is found only on this page (p. 141) and it is not a fact that Biringuccio was allowed everywhere he wanted.

Figure 2. Goldsmiths forge double sheet (Biringuccio, 1990)

Schwartz's book is devoted primarily to the history of thread spinning and others like it, but a couple of drawings are interesting, for example. There are two funny paragraphs in Larsen's book in its translation of K. Finch (Finch, 2005):

> "*Sofus Larsen ends this chapter by describing how the Greeks learned about gold-worked textiles from the prizes of war brought back by the army of Alexander after the fall of Persia. Persian and Babylonian weavers had long before begun to fill the vast stores of Eastern courts with costly excesses of precious garments made from silks woven with figured designs or embroidered with gold and silver and precious stones*".

Another passage:

"*Flat Cyprian gold wire may have been exported already by about 1200 but the method by which it was flattened to achieve comparison with or battu or Insegold remained a secret for a very long time. For more than 500 years after its invention, there was no literature that concerned itself with how it was done. It is not mentioned in Biringuccio's Pirotechnia of 1540, although this was compiled at about the time Cyprian textile workers began to settle in Venice, nor in any other place until the middle of the eighteenth century, when the art of flattening thread had become a relatively common occupation, not only in Italy, but in France and Germany as well*".

Of course, that translation is only Fitch's responsibility and is not proof of anything, just a hint. The hint is: the Greeks adopted the manufacture of gold threads during the time of Alexander the Great (4th centuries BC) and for 500 years the manufacture of flat threads remained a Cypriot secret (1200-1700) almost 2000 years after its adoption.

There are modern papers (Soviet authors too (Laman, 1989)) where a metal thread is made from a wire. Many researchers (Jaro & Toth, 1991; Ward, 2008; Hackea et al., 2005; Katarzani, 2014) write about (a) cutting off threads from a long wire, and about (b) the gilding method (without specifying the method itself). Many of them have noted that textile threads have become both longer and better with the invention of wires. For example, Anna Katarzani (Karatzani, 2014) when she writes about cutting simply refers to V. Biringuccio, and when gilding method whites the following: "*goldsmiths produced alloys of gold with silver and copper and invented methods of gilding less precious metals*" (p. 10).

During review of literature, we found almost nothing with the terms "diffusion" and "gilding" except for the articles by Balta et al. (2015), which use PIXE (Particle-Induced X-ray Emission), necessary software and therefore speak directly about diffusion welding: "*The gilding layer is separated from the silver bulk by an interface layer resulting through atomic diffusion of silver into the gold, which lead to the conclusion that the methods used for gilding were probably either the diffusion bonding or the fire gilding*" (Abstract).

In this article research methods are natural science ones, spectrography, etc. As an additional example, a gilded disc from the British Museum is used. To determine the parameters of diffusion gilding and why it was used for gilding threads, a comparison was made with gold leaf gilding and mercury amalgam. If something is proved it is a theorem and lemma, proof of the theorem is given, the lemma is considered obvious.

There are only two workshops that produce gold threads in England today (Carpenter, 2020).

2. Inventions that could change thread making

Several inventions may have influenced the manufacture of threads. Many modern researchers believe that metal threads were made from wire therefore the first one is the drawing of non-ferrous wire and, later, the invention of the draw plate itself (Figure 3). Wire drawing is believed to have originated around the 20th century BC, when wire was drawn to make jewelry. The small number of wires draws that have survived to this day, when (it would seem), irrefutable evidence of the drawing process exists, is due to the processing of the metal of the dies. Using a die with a cone-shaped hole, the wire could be pulled up to half a square millimeter in area (0.8 mm diameter). However, the wear of the wire dies was significant, most of the dies "lived" only a few wire pulls depending on the length of the wire. Since the dies were made of precious metal and were used for only a few drawing pulls, they were most likely subsequently recycled (reused). In any case, the wire before and after the invention of the dies was different.

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Rollers and roller mills are another invention. It is believed that it was Leonardo da Vinci (1452-1519) who first drew rollers, but in the literature, there are descriptions of the use of rollers by jewelers a hundred years before Vinci. Metallurgists only adapted not their invention for cutting hot iron, but it was the jewelers who were the real inventors of rolling and cutting machines. "During the fourteenth century, small, hand-driven rolls about half an inch in diameter were used to flatten gold, silver, and possibly lead" (Roberts, 1978). Rolls were used not only to make a wire or plate flat and thin, but also to move parallel to avoid possible misalignment. Leonardo da Vinci, for example, drew so-called perspectives, which required parallel movement. Various musical instruments were in use – organs, harps, lutes – created using such a movement. In 1575, the Sienna printer Francesco Rampasetto invented the *scrittura tattile*, a machine for printing letters on paper; maybe the paper was fed in it with rollers.

Figure 3. Drawing wire through a die fixed on a table, Nuremberg, 1625 (Hausbuch 1625)

An invention that could be used to make threads was an obsidian blade. Obsidian (rock glass) was well known, and in particular the Sicilian one. True, by now the use of obsidian blades in the manufacture of threads has almost been forgotten: either such blades were not used at all, or the use of obsidian was especially conspiratorial. The main minerals forming the obsidian mineral are quartz and feldspar. Obsidian is chemically and morphologically extremely variable, being a mixture of different minerals. Obsidian is far from the hardest mineral (5.0-5.5 out of 10), but it is the sharpest. If a steel knife can be sharpened to a minimum blade thickness of 0.05 μm then an obsidian blade, correctly split, can be only 3 nm thick. In any case, there was a blade that cut metal strips without any marks and with a rectangular side. Of obsidian or steel but some kind of sharp blade was used to cut.

The geometry of the cutting edge of knives and other blades has also been improved. Three main characteristics of the edge can be distinguished: (a) the angle of inclination, (b) the radius of the tip, and (c) the thickness of the blade if it is 1 mm back from the edge in the form of a cone (in the manufacture of cutlery, this bevel is called a "channel"). Typical angles are 15° for blades, 20-30° for microtome knives (see below) and 30-40° for kitchen knives. The radius is 5 μm for a scalpel and 17 μm for a new safety razor (34 μm for a worn one).

A little later, the Microtome, a special device for cutting very thin slices of material, known in biology as a cross-section, was invented. At the dawn of light microscopy (before the 17th century), sections of animals and plants were obtained using blades only. It was important that the thickness of any specimen was less than 100 μm in order to view the specimen in transmitted

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light. The first mechanical device was proposed by George Adams Jr. in 1770 and later improved by Alexander Cumming. The device was moved manually, the specimen was placed in a cylinder, and its sections were obtained from above using a handle. The microtome uses steel, glass or diamond blades, depending on the sample to be cut and the desired thickness of the cut parts. The microtome is listed here only to get an impression of how engineering thinking developed during this time.

3. Gilding methods

In ancient times, only seven metals were known: gold, silver, copper, tin, lead, iron and mercury. Zinc, cadmium, etc. were found as chemical compounds in the composition of minerals only. The eighth metal was discovered only in the 13th century (arsenic). Silver (in part) and gold (especially) do not allow corrosion and therefore were actively used as a measure of value, for making coins and in jewelry. The first gold coins were minted in Lydia (Asia Minor) around the 6th century BC.

Let's arrange the gilding methods before the invention of electroplating by appearance of the main component or main property. From about the 30-40th century BC gilding meant gilding with gold leaf (gold leaves are glued to the surface with organic glues). In the 30th century BC soldering on soft (tin and lead) soldiers was invented (MM # 22.1.61). From the 12th century BC diffuse bonding was used. From the 6th century BC mercury amalgam has been applied for gilding. From the 1st to the 10th century AD in the New World and from the 12th century AD in the Old World, nitric acid was invented, which can be used for gilding by depletion, like hydrochloric acid and pieces of chlorine gold. Mr. Oddi lists gold foil also, but forgets about soldering, probably because he writes about statues first of all (Oddy, 2000). Can we accurately identify the gilding method by its composition (see Table 1)?

Table 1. Gilding methods and composition

	Gilding methods	**Composition adds**
1	Foil gilding	organic glue
2	Leaf gilding	organic glue
3	Solder gilding (Humpston, Jacobson, 2004)	tin and lead
4	Diffusion gilding (Aufderhaar, 2009)	—
5	Mercury gilding (Anheuser, 1997)	mercury
6	Depletion gilding (Sáenz-Samper, Martinón-Torres, 2017)	—
7	Pieces of gold from gold chloride	—

Gold leaf, sometimes called gold foil, is gold that has been beaten into a very thin sheet. When depletion gilding is used, a special surface layer appears that can be detected.

According to the EDS, there is absolutely nothing between a gold leaf and a thread: no organic matter, no tin with lead, no mercury. There is no surface layer and gold does not appear in pieces also. It may feel like we've proven something, but we do not know the error. EDS (Energo-Dispersion Spectrometer) is XRF an electron microscope that uses photons generated by the deceleration of the beam electrons, as well as vacuum. Regular custom EDS is installed together with its own software and it is difficult to calculate the error, only by calibration. Lemma 1: If we know the result of measurements V by any device but we do not know the error σ of measurements and even the origin of the error, then the interval of true values V ± σ can be any. We cannot use an EDS because we do not know the error (Towett et al., 2013).
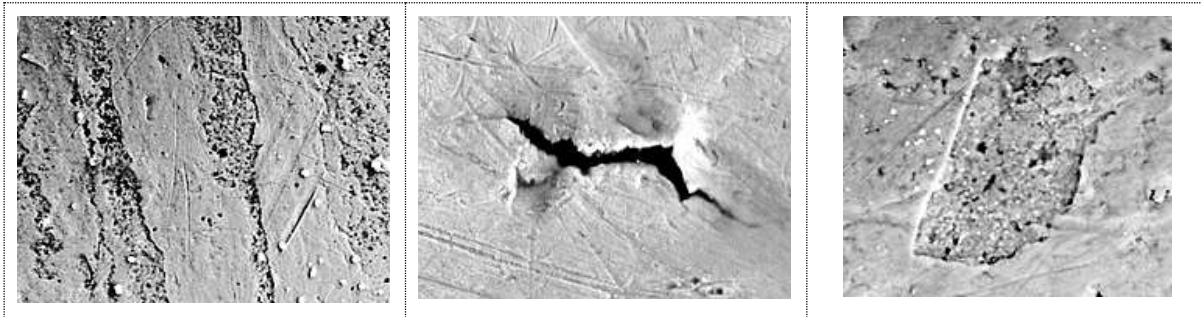
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Figure 4. Defects in gilding: defects are located along the strip, hole, hole edges

Gold may appear as a sheet or as a layer. You can see it where there are some gilding defects (Figure 4). It is better to cross out unnecessary lines (see Table 2).

Table 2. Gilding methods and gold appearance

	Gilding methods	The appearance of gold
1	Foil	~~sheet~~
2	Leaf gilding	think sheet
3	Solder gilding	~~sheet~~
4	Diffusion gilding	think sheet
5	~~Fire gilding~~	~~coating~~
6	~~Depletion gilding~~	~~coating~~
7	~~Pieces of gold from gold chloride~~	~~pieces~~

Finally, the number of bonds between gold and thread can be everywhere or at separate points, often or rarely. You can see where there are gilding defects again, but not in this case. In this case, nothing is visible (see Table 3).

Table 3. Gilding methods and adgesia

	Gilding methods	Bonding points
	Foil	~~rarely~~
1	Leaf gilding	~~rarely~~
2	Solder gilding	~~rarely~~
4	Diffusion gilding	often?
5	Fire gilding	~~everywhere~~
6	Depletion gilding	~~everywhere~~
7	Pieces of gold from gold chloride	everywhere

When the diffusion coefficient is estimated the error can be several orders of magnitude. The diffusion coefficient is equal to the amount of a substance passing through a unit

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area per unit of time due to the thermal motion of molecules with a concentration gradient equal to unity. There are four types of diffusion, they are called surface diffusion, grain boundary, interdiffusion, and tracer diffusion, each type has its own coefficient. We are only interested in diffusion through the surface (the first one), which creates the gilding. Five to ten minutes (contact time) is ~ 10^2 seconds, i.e., the diffusion coefficient must be at least 10^{-3}, and the diffusion coefficient is 10^{-8} — 10^{-10} for copper and gold (Butrymowicz, 1974). In addition to temperature and pressure, the bond area also exists and can also be added to the equation as another (dimensionless) coefficient that is proportional to the contact area. Moreover, this coefficient can be anything, for example 10^{-6}.

What should be the T (temperature), P (pressure), t (connector time) and A (bond area) for gold to bond with another metal to make a gold thread? High temperature (T) destroys the film of deposited air and impurity (in our case) and increases the diffusion rate, while pressure (P) reduces interatomic distances. We live at a pressure of about 0.1 MPa (or 1 bar, or 10 meters of water). The elephant, as well as the lady's heel, generates 0.5 MPa, the blow of the jeweler's hammer generates several MPa, the hydraulic machine generates several hundred MPa. The sheet must be cut into strips, the binding force must be greater than the cutting force of the sheet, the metal underneath and their bond. The estimate of the quantity can only be empirical. The dependence of the gold-gold bond on temperature and pressure (excluding the bond area, most likely some kind of erosion was taken as an average) is shown in Figure 5 (Humpston & Baker, 1998).
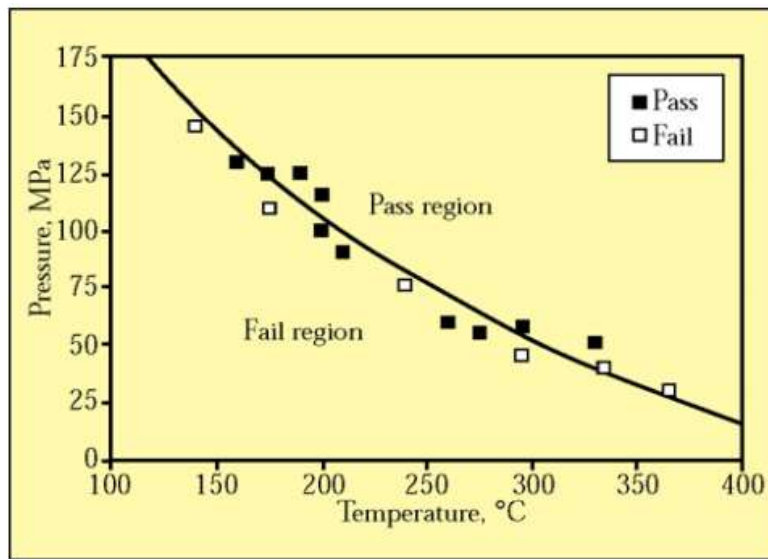

Figure 5. Bonding gold to gold (Humpston, Baker, 1998)

Why was diffuse gilding used for threads? An individual can do as he wants, but in history if not the only method has been used for many centuries, there must be advantages to this method. We see three ones: consumption of gold, adhesion of gold and ease of use (when the metal is only a sheet). We compared the properties of diffuse gilding with gilding and amalgam gilding (see Table 4).

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Table 4. Comparison of the three methods of gilding

Characteristics / gilding methods	Leaf	Diffusion	Mercury
Innovation	30-40th century BC	12th century BC	4th century BC
Adhesion	1	2	3
Gold consumption	2	1	3
Ease of gilding a sheet of metal	2	1	3
Toxicity	0	0	3

To evaluate adhesion numerically you need to specially prepare but an analog method (more or less) is suitable here. Mercury amalgam has very large adhesion, gold leaf has very small adhesion. Diffusion gilding is located in the middle.

1-2 μm was the thickness of the leaf in Modern ages, while the thickness of the gilding in the studied samples was 0.1-0.2 μm. The thickness of the amalgam layer was 2-10.

When gilding metal in the form of a sheet, all three methods are approximately the same. The easiest way is to gild with mercury, then gold leaf in complexity, and finally diffusion, when it is necessary to heat and forge, but again, all three methods are about the same.

Mercury amalgam is unmatched in toxicity (60 people were poisoned with mercury during the gilding of the Dome of the Cathedral of St. Isaac of Dalmatia in St. Petersburg).

An example of diffuse gilding is a disc (Figure 6) from the British Museum (Oddy et al., 1981). Shooting with an electron microscope showed that the silver foil (12 um thick) on one (front) side is covered with 3 μm of gold, and on the other (back) side of the gold layer there are deposits of corrosion products, including silver, sulfur and chlorine. The "legs" of gold penetrate into silver (Fig. 5b). This is a property of silver, rather gilded in the laboratory, where a sheet of gold was polished into a sheet of silver at room temperature. The gold content also changes: 45% on the surface of the part and 10% on the surface of silver.

Figure 6. (a) British Museum # 134907; (b) "Legs" of gold

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4. Cutting methods

A metallic thread is a flat (width to thickness ratio of about 30) wire, gold-plated on one or both sides. Suppose some wire pulls through the rollers had to be divided into several parts and run through the rollers again. The edge of such a wire would be "naturally rounded", but the edge is straight. Suppose otherwise: the wire was not divided into parts and simply passed through a die to obtain the so-called Profile Wire.

Lemma 2. If the wire is rolled with simple straight rollers (non-profile), its edge will be "naturally" rounded ((Wire Facts: Edges and Corners) and others).

Note that the cut adhesion is higher than the adhesion of the gold plating, otherwise the gold may peel off. The cutting edge of the blade is a few μms. The depth of the deformations is approximately equal to the width of the blade, so it is better to drag the blade rather than press it (Lemma 2). Cutting off the metal tape with (blunt) scissors or a knife would have left marks, but these were not detected during the investigation (Lemma 3). In addition, hand scissors would create an increase or decrease in the width of the thread.

Lemma 3. Then the blade is sharp (Reyssat, 2012) and the angle between the blade and the cutting plane is small (Atkins, 2009), so blade will leave very few marks

The sheet will be cut into strips to produce gold thread (spin as it was called), i.e., will be twisted in a spiral around the core. Biringuccio writes in his book that it was "women who are much more patient than men" who knew how to cut into narrow strips with long, flexible and sharp scissors, as long as the length of a strip of gilded silver. Note that the word "scissors" (forbici) is found only on this page (p. 141) and it is not a fact that Biringuccio was allowed everywhere he wanted. The earliest known scissors appeared in Mesopotamia 30-40 centuries ago.

Lemma 4. Traces characteristic of scissors at the edge of the cut will remain if you cut something off with scissors (two blades with a decreasing angle between them) (Petraco, 2011).

Lemma 5. If, when cutting the sheet along with scissors of length A, the error in the width of the strip is equal to B, then the angular error is 360 B / A in degrees. For example, if A = 40 cm (very long scissors) and B = 10 μm (it is real), then the angular error is 0.009 degrees. If there is nothing beyond measure then the angular resolution is equal about 2 * (angular error) or 0.02 degrees. Naked eye resolution of any human is 0.2-0.3 degrees; scissors are impossible when cutting.

There are many views on the problem according to which the cutting method considered to be the main one is not suitable. Another sequence of actions during manufacturing is possible in our opinion:

- drawing a wire from a metal rod Ø1-1.5 mm,

- forging or rolling wire into a sheet 20-25 centimeters wide,

- covering with a sheet of gold (on one or both sides),

- heat,

- forging (or rolling),

- cutting into two strips of any width each using rollers and a blade,

- cutting the resulting strip into two new strips,

- cutting is finished when the strip width is ½-¼ mm as required.

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Figure 7. One of the possible methods for cutting metal sheets in the 15-17th centuries

If the cutting was like in Figure 7, the master divided the sheet in half over and over again until a width would be about 1/4 millimeter. We will assume that the angle between the two rollers is small, and the rollers themselves are perfect and free from defects (both have been used for centuries). Other reasons are important too, such as the curved sheet and the master's ability to draw the middle. It is difficult to say anything about the first one, but the second error is 10-20 times less than the strip width (when you are looking for 5, 4 and 6 are hardly possible, rather 4.5 or 5.5). Until, of course, the limit of the naked eye (about 60 μm) is reached.

5. Conclusion

As a result of research, the author almost proves that diffusion was used for gilding threads in the 17-18th centuries. Comparison of diffusion gilding with leaf and mercury amalgam was made. It is assumed that the main invention that changed the manufacturing technology of metal threads was not wire pulling, but rollers and, consequently, a method of parallel and non-deforming cutting into strips. Moreover, it was jewelers who were the first to use rollers, and metallurgists added them much later. It was assumed that not scissors were used, but rollers and a cutting blade were used to force the lamellae to move strictly parallel. The blade should be positioned at a slight angle to the plane in order to cut with minimal effort and not leave marks that are not there. The widths of the two new lamellas were not the same. The latter assumption can be proved by measuring the width of the lamella over a length greater than the longest scissors.

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Mysteries of Lake Copais: The Drainage – Massive Bronze Age and Hellenistic Hydraulic Engineering Works

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Abstract

Since the draining of Lake Copais in Boeotia in the late 19th century archaeological research has revealed Bronze Age hydraulic engineering works of such a scale as to be unique in Europe. Starting in the Middle Helladic period with dams, dikes and polders, the massive extension of the scheme in the Late Helladic period, with large canals and massive dikes, achieved the complete drainage of the lake; a feat not achieved again, despite Hellenistic attempts, until the 20th century. In this paper we attempt to draw together research in order to tell the history of Lake Copais through the ages.

Keywords: Ancient Boeotia, Lake Copais, Bronze Age engineering, Hellenistic engineering, ancient hydraulic engineering.

1. Introduction

In 1886 a site forgotten to the history of Greece resurfaced almost miraculously from the water after being drowned for at least thirty-one centuries: the plain of Lake Copais in Boeotia. On the ground of the drained marsh, still crowded with a thick vegetation of reeds, enigmatic remains of dykes and canals appeared. This amazing discovery led archaeologists to search the newly drained plain for evidence of the date and methods of the earlier drainage of the lake.

Boeotia and Attica form a long peninsula, therefore bathed by the sea on three sides; but Boeotia is so isolated from marine influence by the mountain ranges which surround it that winters are harsh and summers are scorching. As the highest mountains are to the north, west and south, the plain is especially exposed to the winds from the east. Following Theophrastus (V,12,3) we can also assume that before the intensive drainage the constant moisture maintained in the plain by the evaporation of the marsh was more important and mitigated the rigors of the climate.

In the 2nd century A.D. Pausanias (Book IX) described the region of Boeotia, which lies north-west of Attica, about one hundred km from Athens (Figs. 1 and 2), commenting that the marshy Lake Copais was famous in his times for its huge and delicious eels (Pausanias, IX 24,2). In the first half of the 19th century the inhabitants of the province began to consider draining this marshy area of 250km², which was very unhealthy in summer and flooded in winter. Located at

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the foot of high mountains, covered by snow in winter, the marshes of Lake Copais were indeed fed by many rivers, in order of decreasing importance: the Kephissos,[1] the Melas, the Herkyne, the Phalaros and the Lophis.[2] In summer, the waters of the marshes were partly reduced by evaporation, but throughout the year, their overflow drained to the east of the lake into twenty-three sinkholes (*"katavothres"*), natural cracks in the karstic limestone. Becoming underground waters, they joined the sea in the Gulf of Euboea, some 3km distant. A first attempt at drainage was carried out by a French company at the end of the 19th century. After its partial failure, a British company undertook more significant works which made possible the final, complete drainage in the 1930's (Dean, 1937; Idol, 2018).

- Lake Copais, Boeotia, was completely drained from the Middle to Late Bronze Age.
- The hydraulic works, massive canals, dams and dikes, are unique in Europe.
- The system collapsed at the end of the Late Helladic IIIB period.
- An incomplete attempt at drainage was made in the early Hellenistic period.
- The lake was drained again in the 1890's allowing archaeological research.

2. Lake Copais before the modern drainage

In 1850, before its drainage, Emile Burnouf, a member of the French School of Archaeology of Athens, published a report on Lake Copais, as it appeared at that time, with reference to ancient authors. As he says, the lake was in the form of a square, with two bays at the west and two others at the north-eastern banks (Fig. 2). In the east, the lake was delimited by the steep flank of a limestone outcrop which separates it from the Gulf of Euboea. The marsh covered the lower part of the Kephissos valley, on an alluvial slope from southwest to northeast. Its deepest part was at the foot of the outcrop on which was sited the ancient city of Copae (modern Kastro) (Strabo, IX, 2, 27). In the riparian plain, fruit trees grew in abundance: almond, peach, hazelnut, apricot and pear, and cotton and madder (*rubia tinctorum*) were cultivated, but the area was subject to flooding.

The south-western bay of the lake stretched up to 7km from the city of Orchomenos which was situated on the eastern end of a rocky spine, some 12m above the marsh level around it (Fig. 2). The low waters of the lake covered 150km² and the high waters 230km². The flood-depth was of 6m at its deepest near the city of Copae in January and February. In the north-east, the lake was separated from the Euboean Gulf by a pass at Kephalari, 35m higher than the lake level and thus it could never have joined the sea. Such land-locked basins are quite common in the Balkan peninsular and may be found at considerable heights above sea-level as "mountain-plains" such as Lassithi in Crete or as lower endorheic basins or "polje".

2.1 *The commentary of Emile Burnouf, 1850*

Emile Burnouf noticed: "However, Lake Copais seems to have changed appearance and extent several times in ancient times. The oldest phenomenon of this kind in history is the

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[1] We can claim no consistency in the transliteration of Greek names. We have used the "old English version" where the names are generally known but a closer transliteration from Greek where the names are less well-known.

[2] The modern annual flows of these rivers are estimated as: Kephissos 179hm³, Melas 130hm³, and the Herkyna, Pontzas and Lofis together 44hm³ (Mamassis et al.*,* 2015).

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flood of Ogyges.[3] It had nothing in common with the deluge of the Eastern tradition, but covered the wide valley of the Cephissus and crossed the mountain passes separating Lake Hylice from the Teneric Field, as well as the crest that distinguishes this field from the plain of Thebes. All these subdivisions of the Eastern Greek basin were covered by water as well as the plains from Thebes towards Chalcis. And nothing excited more the curiosity of travelers than seeing where the alluvium ends and the limestone begins at the edge of the limestone massifs." Burnouf continued: "Boeotia was originally called Ogygia: If there was an Ogyges (and if this name is that of a man and not of a race or of a very ancient civilization), it was probably during his reign that the flood took place; it was by rain or by extraordinary snow that the level went up; but it is necessary for the waters to reach such a height that the sinkholes (*katavothres*) were blocked for a while." And here he quoted Strabo (IX, 2, 16) on how water sources sometimes appeared or disappeared from the surface.

Further, Strabo (IX, 2, 40) reported a popular tradition that in ancient times, the ground of the Copais basin was dry and well cultivated by the Orchomenians who had been very rich. He also noted that an engineer named Crates (Strabo, IX, 2, 18) had been ordered to carry out major construction works at the time of Alexander the Great: he was asked to "raise the dikes and to clean them! But as only channels can be cleaned, this sentence appears incomprehensible," Burnouf noticed.

3. The first revelations of the ancient works

The swamp was drained at the end of the 19th century by the British Lake Copais Company. Immediately the dried lake bed revealed traces of very old works, namely dykes and canals. These observations were carefully recorded in 1892 by Michalis A. Kambanis, a Greek archaeologist who was very familiar with the region and published his observations in 1892 and 1893.

Firstly, he noted the traces of a huge project undertaken by ancient people to join the lake with the sea. He noted on the pass of Kephalari at the north-east end of the lake, attempts to cut a tunnel of more than 2km in length by means of sixteen vertical shafts dug in line following the depression of the pass between the lake and the sea. These shafts, all of them almost dug to depth, and the gallery cut along one-third of the total length attest to the magnitude of these efforts (Kambanis, 1893). Secondly, at the south-east end of the lake, he found the remains of a huge trench, which had reached more than 30m depth through the limestone rock, to cut through the Karditza pass which separates Lake Copais from Lake Hylike. "The traces of work started on the passes of Moriki and Anthedon to connect Lake Hylike with Lake Paralimni and this latter to the sea, remained as a draft of the present drainage works"[4] Kambanis noticed. "But there are other works dating back to an unknown time and whose meaning is obscure (Fig. 3). Indeed, we see in the lake a series of strong earthworks forming dykes that so far and according to their visible parts are considered to form channels of communication through the lake's bays. They consist of an ingenious combination of high dams and trenches around the lake, that embraced all the rivers and streams draining into it, establishing channels flowing to the sinkhole region, sometimes using a single dyke running parallel to the rock edges, sometimes – and this only in the places where they had to cross the bays of the lake and where the edges were not protected by sufficiently high berms – by using two dikes running in parallel and forming a canal between them. The

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[3] The myth of Ogyges has many variants. According to Pausanias he was King of the Ectenes, the first people of Boeotia. One of his daughters, Alalkomene, gave her name to one of the cities in the south-west of the Copais basin.

[4] It is a strange omission that no modern researchers seem to refer to these massive channels which may have been an element of the uncompleted Hellenistic drainage system.

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capacity of this work was obviously enlarged by the excavation of a large trench within the dykes. In the best-preserved parts, these dykes were 40 to 50m wide at their base with a height of 1.50 m, which leads one to assume that they have suffered collapse and general wear caused by floods in periods of heavy rains. The project's authors had cleverly divided the waters of the lake into three main channels. One that ran through the northern region, one through the central part and the last through the southern region.[5] As well as these three main canals, we also see the traces of a number of secondary channels that flowed into them. All of these channels led from the tributaries towards the sinkholes taking advantage of the natural fall in that direction. Having explored the location in the east that seemed to him to be the confluence of the channels of which ten continued as a single channel leading to the main sinkholes, he found that this carefully constructed masonry was similar to the constructions at Tiryns and had many similarities with the walls of the island of Gla. "These are", he said, "the best evidence to show us, at least with some approximation, that this work relates to an era that corresponds to the floruit of the Minyans, the subjects of Minyas, King of Orchomenos."

In 1935 the American archaeologist E. J. André Kenny took over the exploration of the Copais plain. By topographic survey, he found that the bottom of the former lake had been lowered in places by up to 3.50m, as a result of the compaction of the sediment and the extraction of peat by the inhabitants. He also noticed that a number of heaps of stones of 10 to 16m in diameter had appeared on the surface almost in the center of the plain, south of Stroviki, probably as a result of the same phenomena.

In 1973, the Greek archaeologist T.G. Spyropoulos reported that during a small excavation near the northern dyke of the lake, he found a few shards of pottery which, according to him, belonged to an early phase of the Middle Helladic period, at the beginning of the 2nd millennium. However, these shards only provide a *terminus post quem,* not necessarily a date for the construction of the dyke. Subsequent work suggests a date towards the end of the Middle Helladic period (c. 1700 BC) for their construction.

Lake Copais' issues had to be addressed again following the discovery in 1978 of an important Greco-Roman site in a location which, according to traditional criteria, must have once been flooded for at least part of the year. The site marked on the figures as "Xinos" which has produced both Late Helladic and Roman-Early Byzantine material with a nearby dedication naming Apollo Paiaonas. Following the final draining of the plain and the excavations made by Greek archaeologists up to 1982, we could think that the ancient kingdom(s) of the region had recovered their history. But, after four campaigns of successive excavations from May 1984 to June 1986, Pr. J. Knauss and his team of the Technische Universität of München provided important new discoveries.

In more recent years surface survey and geophysical prospection has added considerably to our knowledge of the north-eastern part of the old lake and we can hope that the central area will also yield up its secrets to similar research in the near future (Kountouri et al., 2013; Kountouri & Lane, 2018; Lane et al., 2020).

4. The phases of hydraulic works in the Copais basin

In their first report Knauss et al. (1984) presented a complete study of the basin, on the historical and literary levels, as well as on its hydraulic and archaeological aspects. Thanks to

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5 However, it was found that the "central canal" bordered by earth walls, much weaker than the masonry dikes of the north, south and east canals, did not pertain to the drainage system built in the Mycenaean period, but probably was part of the works started by the engineer Crates as ordered by Alexander the Great (Knauss, 1984).

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a global survey of the area using modern techniques of investigation (aerial photography and analysis of micro-photographs), the multidisciplinary team highlighted a first phase of works in the basin in the Middle Helladic period.

4.1 *The Middle Helladic period (Fig. 4)*

The Middle Helladic engineering works constituted several zones of "polders", rich zones of cultivation recovered from the marsh and protected by a system of low dams or dykes made up of only one wall of rough stone built in polygonal style. The widest of these polders consisted of the "Bay of Topolias" to the east of the ancient city of Copae including the island of Gla, bordered by only one wall of rough stone built in polygonal style. This vast zone was protected on the side of the marsh by a long rectilinear dam, which started from Cape Mytikas and joined Copae, where it bent towards the east, following for a short distance the discharge system of the lake which crossed the whole north-eastern bay to irrigate the fields, before flowing into the sinkholes. This allowed the development of a large Lower Town at Gla nearly connecting it to the site of Copae.

A similar dam closed the "Bay of Davlos" at the south-eastern edge of the lake close to the ancient city of Medeon. Further, we can suppose that the dam known as "the wall of Kenny-Lauffer" (Kenny, 1935; Lauffer, 1979), in the north of the lake, enclosing a zone which extended from the small island of Tourloyannis to near Copae, also protected a polder around an ancient site (modern Stroviki) for which Knauss posited a possible identification as Mideia.[6] However, all attempts to identify the archaeological sites with known, Homeric or even Classical names are, in the absence of inscriptions, highly speculative.

4.2 *The Late Helladic period (Fig. 5)*

The two subsequent campaigns of excavations carried out in October 1985 and May 1986 (Knauss, 1986), made considerable progress in the understanding of the drainage system. After an inundation of the MH polders, possibly due to a rise of the lake level following an increase of the rainfall at the end of the Middle Helladic or a failure of maintenance of the main sinkholes, a new system of land reclamation was created during the Late Helladic period (LHIIIA2 and LHIII BI) (Fig. 5). This was a real attempt to regulate the rivers and drain the whole marsh, which made it possible to control the level of the lake during the flooding of its tributaries and to completely dry the central part of the basin during the summer months at least. The installation of this powerful hydraulic engineering work could have been carried out within one or two generations.

The major element of the complex was the main northern, embanked canal which was 40m wide, 2.50m in depth and some 25km long and led the waters of the Kephissos and Melas rivers directly to the sinkholes. To the immediate south of this canal was a massive levee 30m wide faced on both sides by Cyclopean walling. In addition to its main role in regulating the lake level and transporting drinking water, this channel could also have been used for inland navigation and for the transportation of goods to the east of the basin, from where they could be conveyed by land through the pass of Kephalari to the port of Anthedon on the Gulf of Euboea. Similarly, the wide levee could have provided a roadway for cartage of agricultural products. Knauss also suggests that in summer, when the marsh was dry, the high valley of the Melas, closed by a dam, was used as a reservoir for irrigation water (Fig. 5). In a late phase, a diversion canal was built, connected to the beginning of the main channel between Copae and Marina-Pyrgos, to supply water to the area of Gla and undoubtedly to make it possible to convey goods there by water. More recent

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[6] This is the modern Stroviki which has EH and LH finds, as well as two nearby forts on the hill of Tourloyianni recognized as Mycenaean (Farinetti, 2011).

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intensive survey in the area of Gla has shown LHIII rectilinear divisions of the reclaimed land as well as Cyclopean walls at the nearby sites of Ayia Marina-Pyrgos and Agios Ioannis (Kountari and Lane, 2018; Lane et al., 2020).

4.3 *Evolution of the lake and marsh in ancient times*

Very detailed topographic studies have made it possible to reconstruct, with sufficient probability, the extent and the seasonal levels of the lake at the various stages of its evolution (Ulrichs 1847, Knauss et al., 1984, Mamassis et al., 2015). These attempts at reconstitution are shown (Figs. 4 & 5) describing the various phases of the extent of the lake, which was never as large in antiquity as it was in the 19th century immediately before its drainage (surface area: 240km², 110km of banks).

In the Middle Helladic period (Fig. 4), at the creation of the first polders, the water level in winter reached 95m above sea level giving the lake an average depth of 2.50m, which declined in summer to 93.5m. Dams approximately 1.50m high thus made it possible to preserve the irrigated zones of cultivation, the polders, from winter flooding. The waters of the Melas and Kephissos were controlled by a sufficient outflow capacity of the sinkholes (*katavothres*) and there was no standing water. As the land was favorable to cultivation, many settlements were located on the lake banks beyond its winter limits, in particular on the southern and western banks, and it can be estimated that other vestiges of this period of the first part of the 2nd millennium currently rest under a layer of approximately 75cm of sediments in the zone of the ancient submerged banks of the lake.

In the Late Helladic IIIA/B period (Fig. 5) the ancient zones of cultivation on polders were recovered again from the marsh and the lake was completely drained at least in the summer. In winter, one half of the water could be absorbed by the sinkholes, the other half probably remaining in the plain (maximum height of the lake: 94.5m; surface area 130km², 55km of banks). In summer, when the flow of the tributaries was reduced, one half of the water disappeared into the sinkholes and the other half evaporated, so that the central part of the basin was dry. A. J. Kenny (1935) located several piles of old stones in the center of the ancient lake. But these mysterious stone mounds, investigated at our request by J. Knauss in May 1987, were identified by him as simple tumuli, plundered a long time ago by tomb robbers. The few shards of pottery scattered around were too insignificant to allow a precise dating. However, the presence of burials in the center of the plain thus makes it possible to confirm that this part of the basin was quite dry during the Mycenaean era, as had already been shown (Knauss, 1986).

5. Late Helladic IIIB/C collapse of the drainage system

It is at the end of the Late Helladic IIIB period that this vast hydraulic complex, unique in scale in Europe at its time, was devastated and the whole basin was completely submerged by the rise of the waters in the plain. The most likely cause is detritus blocking the main sinkholes receiving the discharge from the lake but we cannot rule out deliberate breaking of dams and canal banks. The whole basin was probably quickly flooded, destroying the polders and all the low-lying cities. At the same time, excavators have shown that many of the major settlements show signs of burning suggestive of warfare. Some settlements were reoccupied in LHIIIC, e.g., Orchomenos, but most were not. In and around the Copais basin, we know of some 18 settlements of LHIIIB date but only 5 with evidence for continuation in LHIIIC. Ancient authors attributed this collapse of the drainage system to warfare between Thebes and Orchomenos with Heracles as the key

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protagonist either deliberately blocking the sinkholes or destroying dams and dikes depending on the interpretation of the ancient sources.[7]

However, J. M. Fossey (1988) showed that there had been a similar decline in settlement numbers in the LHIIIC period across the whole of Boeotia, so it was far from unique to the Copais basin. In 2020 Laetitia Phialon published an important review of the possible archaeological evidence for such inter-palace rivalry in Boeotia, but the events behind the collapse of both settlement and drainage works remain obscure. It is at that time, c. 1200 BC, that most of Greece entered a period of decline, which explains why only some fragments of history have reached us. The majority of these pseudo-historical accounts are in the form of legends with vague outlines, merging more or less with the mythological tales elaborated in later periods and transmitted mainly by a long oral tradition. They were saved from oblivion by historians of the Classical period who collected them from their contemporaries or re-copied them randomly in compilations from authors who had preceded them and whose works have now disappeared.

6. Hellenistic attempts at drainage (Fig. 6)

A remarkable "third phase" of attempted drainage of the lake seems to have been undertaken in the Hellenistic period. The main component was the unsuccessful effort to dig a huge tunnel under the pass of Kephalari to drain the waters of the lake into the Gulf of Euboea. This was a colossal undertaking. The tunnel would have been 2.2km long with 16 vertical shafts to provide air, the deepest of which would have been over 56m deep, all dug through solid rock (Fig. 7). The dating of this attempt to bore a tunnel under the Pass of Kephalari is a subject of controversy. According to Kambanis (1893), such a work requires developed engineering techniques and only Crates could have conceived of the project to completely drain the marsh by means of an underground artificial outflow drain under the bottom of the lake. According to Strabo (IX 2,18) the work done by Crates on the order of Alexander the Great lowered the level of the lake for some time, so the ruins of the cities would have then reappeared. But Crates' project could not be brought to completion because of disagreements among the Boeotian people. The water level rose back and the ancient cities were again submerged.

Kenny (1935), noticing that such works had been carried out in Egypt under the reign of Amenophis IV, contemporary with LHIIIA in Greece, suggested that this tunnel was the logical conclusion of the system of channels set up in the Bronze Age. However, it compares well to the great tunnel of Eupalinos on Samos which was built in the mid-6th century BC but which is only half the length. Perhaps the best parallels are to be found in the mining tunnels at Laurion in Attica of Hellenistic date (Chiotis, 2015) and therefore we prefer an early Hellenistic date.

As well as the tunnel, to Crates is attributed a "central" canal running east from the center of the Lake near the multi-period site of Xinos to the sinkholes of Phtelia a short distance south of the abandoned citadel of Gla. A third "southern" canal linking the Phalaros River to minor streams running into the lake from the southern hills can be traced for a short distance but it has largely been destroyed by the modern drainage works.[8] Both the "central" and "southern" canals are far less strongly built than the Bronze Age northern canal and are therefore ascribed to a later

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[7] For details of Herakles' role from ancient authors see Graves, 1955, 121c-d.

[8] Prof. Knauss claimed to have found no traces of the "right channel bank" mentioned by Kambanis (1892). The last vestiges of this ancient canal were uncovered by the Main Canal built by the French Company of Copais according to the engineer Sauvage (1846) whose first project virtually reconstructed the channel system set up by the Boeotians. The dam and channel (found by Knauss) that protected the lower town of Gla, was the last stretch of the right bank canal as it joined Copae.

date. However, it should be noted that both or either would have made good sense as part of the Late Bronze Age drainage system.

Another enormous but incomplete effort, probably dated to the Hellenistic period, are the great cuttings up to 30m deep which were designed to connect the eastern bay of Lake Copais to Lake Hylike and thence to Lake Paralimni, reported by Kambanis (1892), which would have been an exact precursor of the early 20th century drainage works. If it had been completed this would have required a canal more than 1.5km long and at least 90m deep in places, another truly vast undertaking.

7. Reports of the ancient authors

Few data about the history of Boeotia in the 2nd millennium are now available. J. R. Buck in his "History of Boeotia" (1979) gathered the principal elements found in the works of minor historians (Hecataeus of Abdera, Hellanicus, Pherecydes). This history is summarized as a succession of kings, the majority without direct descent, power being transmitted randomly according to the political situation of the moment, the most influential ruler "inheriting" the throne left vacant by the disappearance of his suzerain.

According to the Boeotian tradition, one of the first sovereigns to have reigned in the area was Athamas, son of Aiolos, king of Thessaly. The biography of Athamas is relatively well-known to us thanks to the legend of the childhood of Dionysus, grandson of Cadmus the Phoenician, King of Thebes (Pausanias, IX, 34, 5). It seems that Cadmus was a contemporary of Athamas, who had married his daughter Ino in a second wedding. The couple then adopted the child Dionysus, son of Semele a sister of Ino who had been seduced by Zeus and died, struck down wishing to contemplate the god in all his glory. Having taken under his protection this illegitimate child of Zeus, Athamas was pursued by the anger of Hera who made him kill his own son, Learchus, in a crisis of madness. Banished from his kingdom for this infanticide, Athamas obtained from Andreus, king of Orchomenos and son of the river Penae (thus a Thessalian like him), the permission to retire to Mount Laphystios and to reign over the cities of Coronea and Haliartus in the south of the plain.[9]

But finally, it is Minyas, to whom the Minyans owe their name, who seems to have been the most powerful of the sovereigns of Orchomenos. He had, says one, amassed immense wealth and perhaps it is to him that one would attribute the great works of engineering in the plain. This would explain the filiation with Poseidon allotted to him, this god being the lord of water par excellence. Notably, Minyas also originated from Thessaly and there seems to have been considerable Thessalian influence on the Classical religious sites around the Copais Basin, most notably Athena Itona.

Lastly, various elements of local tradition can be added. There are several couples of mythical twins in the Boeotian legends: Trophonios and Agamedes at Orchomenos, Amphion and Zethos at Thebes, Leucippe and Ephippos at Tanagra. According to Buck (1979), this may have arisen from ancient, Mycenaean worship of divine twins associated with the construction of fortified cities in the various valleys. Moreover, Onchestos had been the seat of a very ancient worship of Poseidon, who was also honored in Orchomenos. It seems that a ceremony binding Onchestos to Orchomenos, by the filiation of an Orchomenian hero with Poseidon, was part of the celebrations or that a rite of supplication existed there. This panboeotian worship of Poseidon in Onchestos is thought to have its origin in the Bronze Age. Thus, the archon of Onchestos would have had sacerdotal functions. It is also noticeable that there were many Classical shrines dedicated to Heracles in the area, for example at the source of the Melas River.

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[9] For further details and speculations on the myths surrounding Athamas see Graves, 1955, 70.

8. The sunken cities

Various hypotheses have been proposed from ancient times for the identification of the cities submerged by the waters of the reformed lake. According to the legend five cities, at least, were drowned: Eleusis and Athenae-on-Triton according to Strabo (IX, 2, 18), which are probably in the south-west of the plain between Haliartos and Orchomenos, and Arne and Mideia (Strabo, IX, 2, 35) cited by Homer among the Boeotian cities (Iliad, II, 596), but on the location of which the ancients knew nothing more. According to Pausanias (IX, 40, 3) the ancient name of the city of Chaironeia, north of Livadia,[10] at the western end of Lake Copais on the River Kephissos was Arne. However, Strabo (IX, 2, 34) says that Akraiphion at the eastern edge of Lake Copais was "named Arne by the poet" (Homer). Finally, if we may believe Strabo (IX, 2, 42)*,* we can assume that the ancient city of Orchomenos was also submerged.

Remains of sunken cities have been located to the west of the supposed bank of the lake in the Middle Helladic period (Knauss et al., 1984) (Figs. 2 & 4)); in particular at the mouth of the Herkyne river, in a place now named Xinos, on a low island occupying a key position in the center of the basin, the remains of a settlement were found, strewn with many shards of pottery, which made it possible to determine phases of occupation from the Middle Helladic through Late Helladic IIIB as well as Roman and early Byzantine (Fig. 8). Following Pliny the Elder (Natural History, II, 206), this place has been claimed as the ancient Boeotian Eleusis (Knauss et al., 1984; Knauss, 1986). Whatever its identity, there is no doubt regarding its key location at the center of a web of intervisibility (Fig. 8).

Other vestiges 5km east of the present Orchomenos have been suggested as the ancient "lower city" mentioned by Strabo (IX, 2, 42) (marked "Old Orch" on figures). However, as this site is 5 km from Orchomenos itself it seems more likely that it would have had a separate name though the mobility of place-names is a well-known phenomenon in Greece. Possibly, Strabo was referring to an area just below Orchomenos but on the plain which would have been flooded and is now covered in lake sediments.

A heap of stones and some shards on the surface in the south-west of the plain has been suggested as ancient Athenai at the mouth of the river Triton. In the north of the basin, on the Melas river, on the rocky headland by the modern Pyrgos aerial photographs as well as remains on the ground also suggest a settlement dating from the Early to the Late Helladic periods which Knauss has identified as Aspledon.

During the two last campaigns of Knauss' excavations, the vestiges of the lower city of Gla, protected from the marsh by a dam or dyke were unearthed. Sadly, his survey and excavation work ended in 1986. However, since then there have been some notable advances, not in trying to identify archaeological sites with the ancient place-names, but with our understanding of the ancient hydraulic works. But in the absence of epigraphic finds on the excavated sites it remains the case that attributions of ancient place-names to sites inside the basin, Arne, Medeia, Eleusis, Athenai and Old Orchomenos remain speculation. Sadly, despite the remarkable discoveries over the last 130 years, the mythic rulers of ancient Copais have still not recovered their true homes.

8. Conclusion

Since the late 19th century draining of Lake Copais, archaeologists have revealed a massive system of drainage that is unique in scale and method in Europe. The first dikes and polders were created in the Late Middle Helladic period. In the Late Helladic massive canals and

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[10] There is a known site of Early to Late Helladic date called Magoula Balomenou, close to ancient Chaironeia, lying beside the River Kephissos, which has been suggested as Pausanias' location for Arne.

dikes achieved the complete drainage of the lake making a vast area available for agriculture with the possibility of irrigation in the summer months. At the end of Late Helladic IIIB this whole system collapsed and the basin was catastrophically re-flooded. The cause of this disaster remains obscure. The ancients attributed it to strife between the kingdoms of Boeotia but it coincides with a general decline throughout Greece. There is evidence for a renewed attempted to drain the marshy lake in the early Hellenistic period with massive works including a long tunnel and great cuttings intended to join the lake to Lake Hylike, but this attempt was not completed. It was then left to the modern era before such massive hydraulic works could be completed.

Despite the great achievements of research to date many questions remain unanswered. The identification of the archaeological sites with the named ancient cities which were destroyed when the plain of Copais returned to a lake remains highly speculative in the absence of epigraphic evidence. The nature of the huge citadel of Gla remains obscure despite the greatest efforts and finally the causes of the collapse of the system at the end of late Helladic IIIB remain unknown. We can only hope that further work will shine yet more light on this extraordinary region.

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Appendix

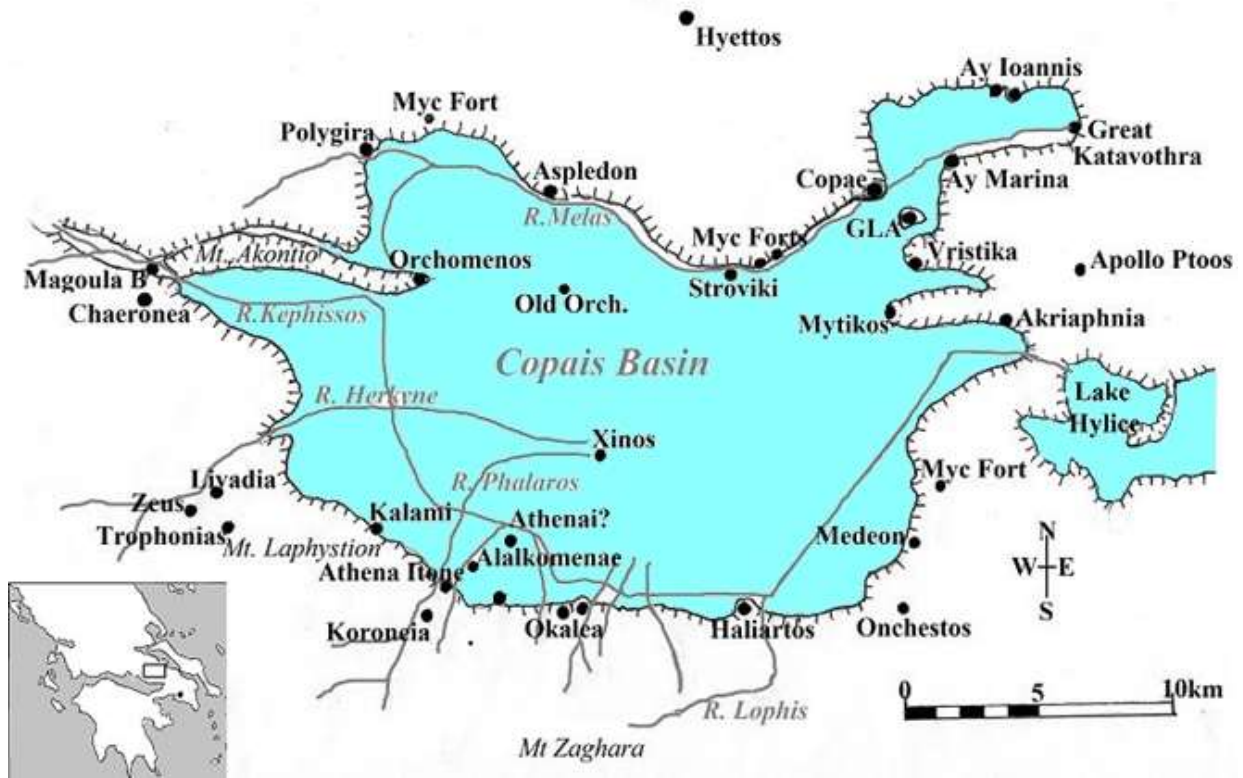Figure 1. Location of Lake Copais, Boeotia

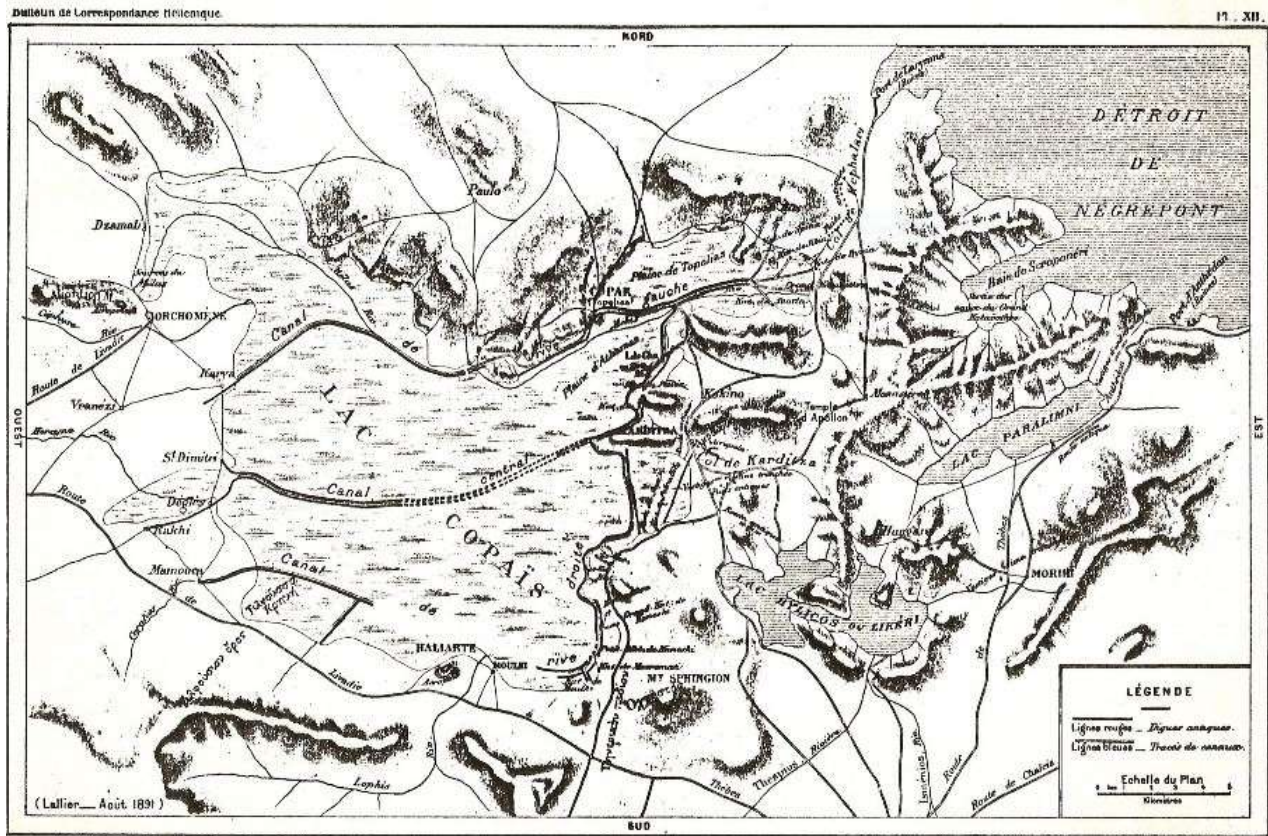Figure 2. Archaeological sites in and around the Copais Basin

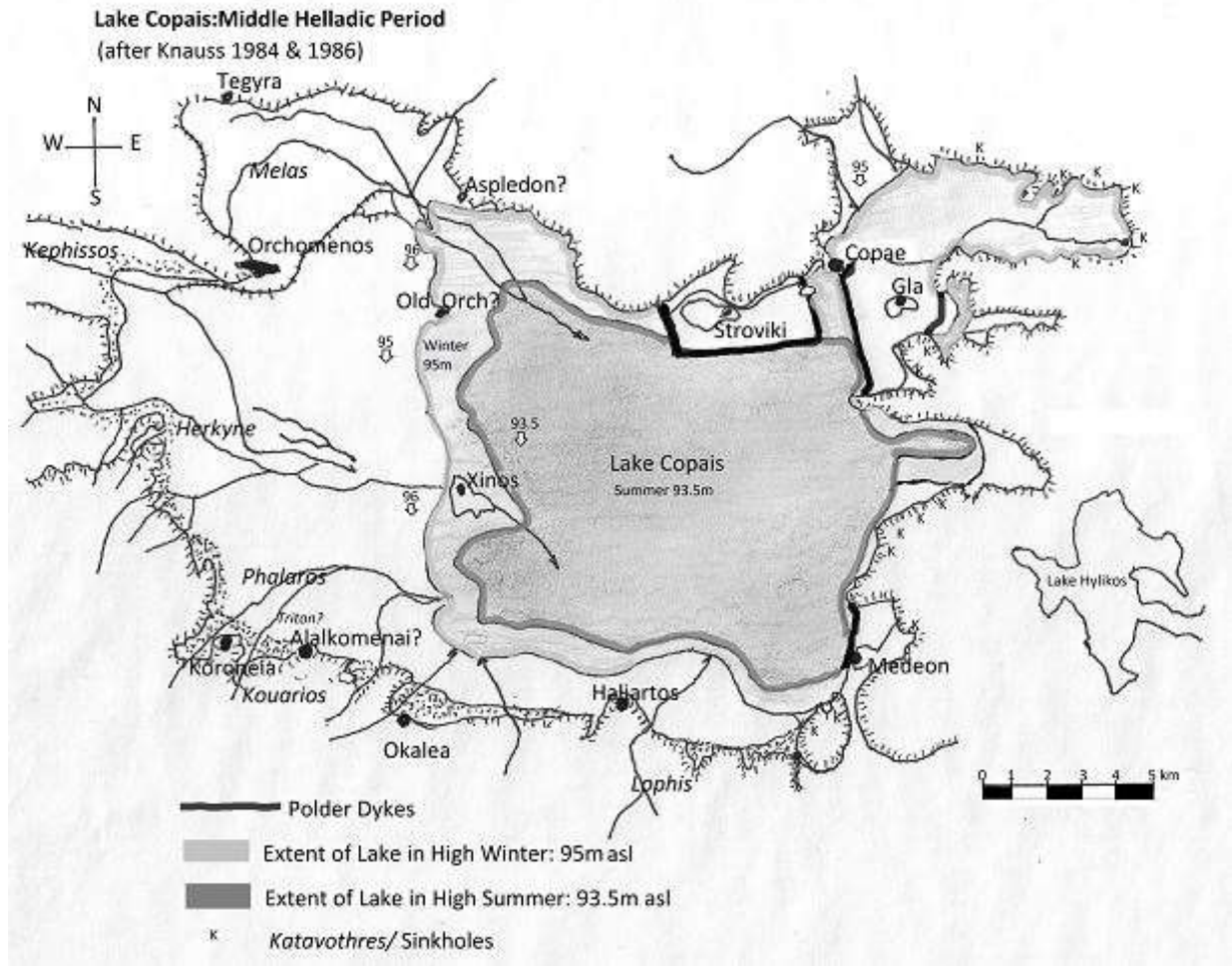Figure 3. Map of the Copais Marsh by Lallier 1891. showing "the hydraulic works made by ancient people"

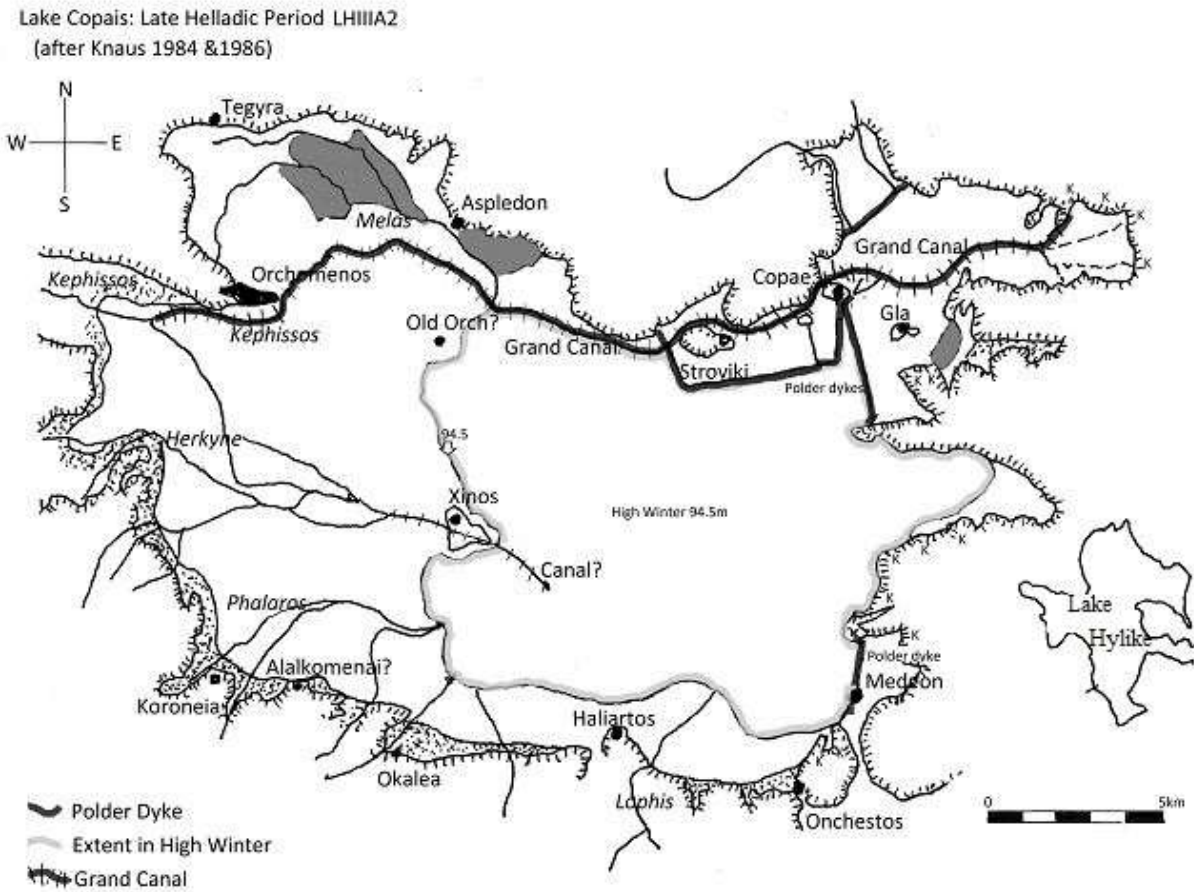Figure 4. The Copais Basin in the Middle Helladic period (after Knauss, 1984 & 1986)

Figure 5. The Copais Basin in the Late Helladic period (LHIIIA/B) (after Knauss 1984 & 1986)
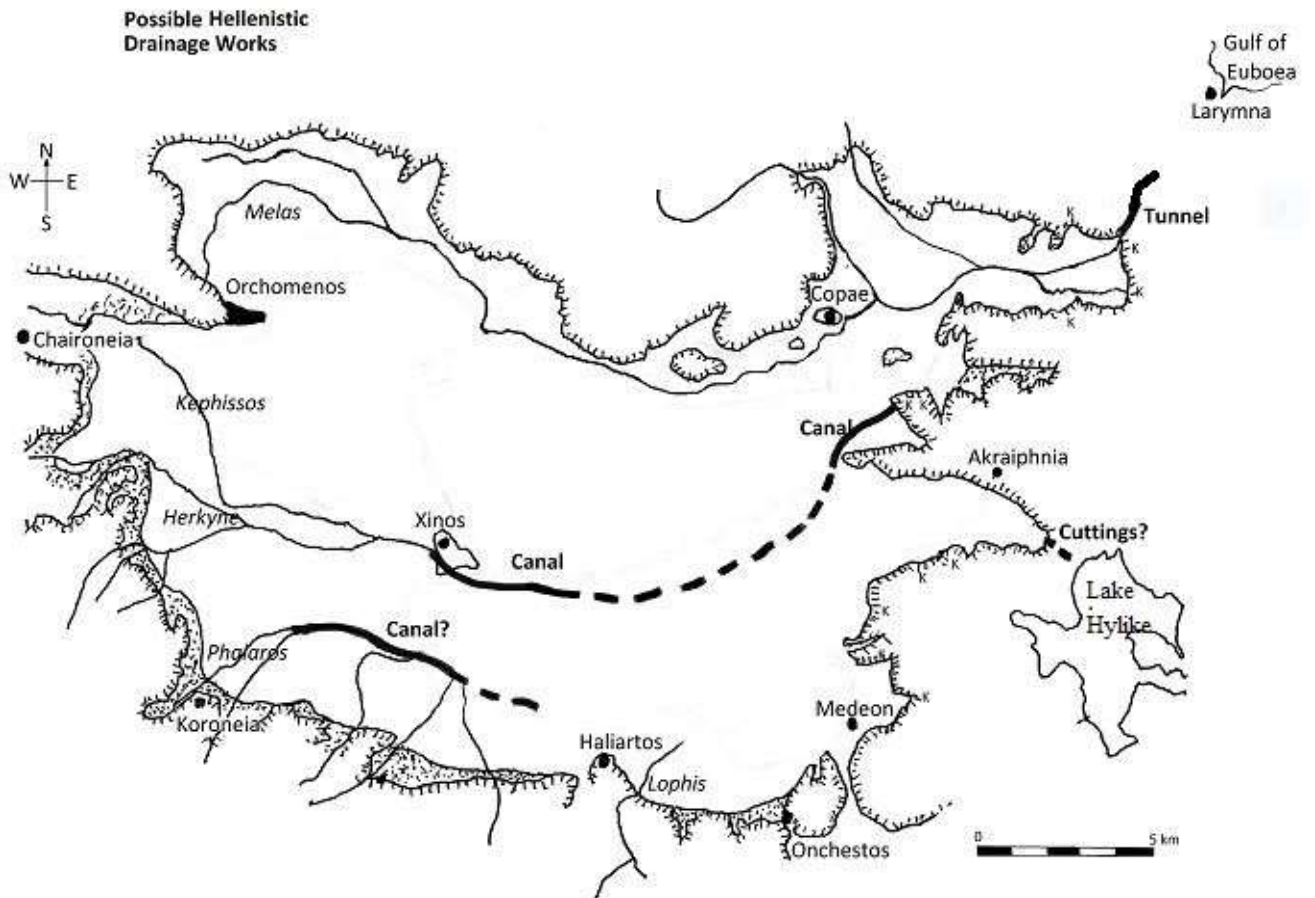
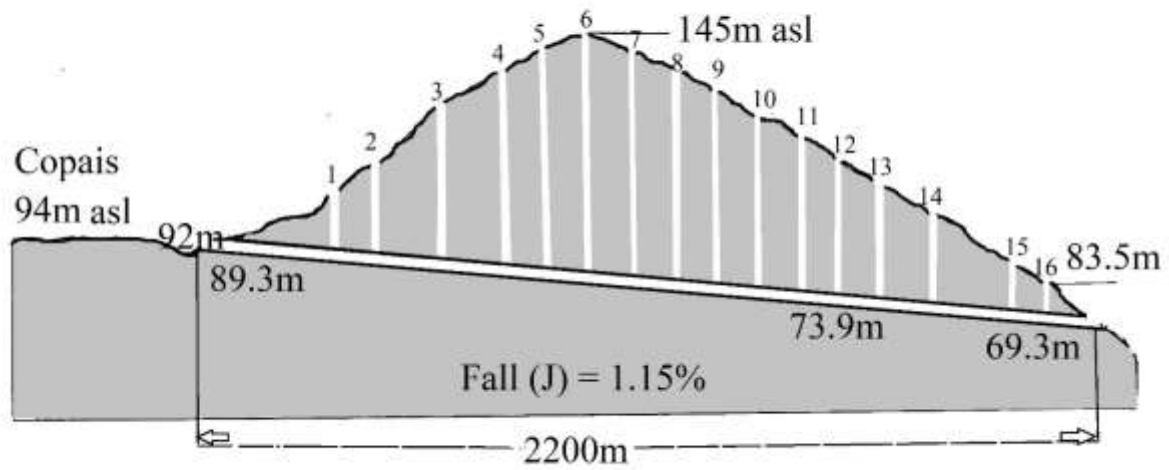Figure 6. Attempted Drainage works probably of Hellenistic date

Figure 7. Cross-section of the Tunnel under the Kephalari Pass (after Kountouri et al., 2013)

From "Shock and Awe" to Asymmetric Warfare in Modern Military Warfare

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Abstract

This study aims to present the strategies from "Shock and Awe" to asymmetric warfare in modern military warfare. The main points in the article are: Introduction: The lessons of a war - The Yom Kippur War; In the years before the Yom Kippur War; After the Yom Kippur War, the American military understood that it had to focus on mobile and rapid warfare against regular armies, an issue that had been neglected over the past decade; The "Shock and Awe" battle strategy. In conclusion: a very important element for coping with asymmetric warfare is the psychological strength of the civilian population. As stated, one of the ways of warfare of the weak side against the strong side is the marking the psychological sensitivity of the civilian population of the strong side as a target. A psychological attack on the civilian population can manifest itself in the launching of missiles at it, the control of its information, the multiplicity of casualties of its soldiers and the sowing of a sense of frustration in it due to prolonged confrontation.

Keywords: Yom Kippur War, "Shock and Awe", modern military warfare.

1. Introduction: The lessons of a war

The Yom Kippur War, also known as the October War (Hebrew: מלחמת יום הכיפורים), was a war waged by a coalition of Arab countries, led by Egypt and Syria, against Israel between 6 and 25 October 1973. It was fought mainly in the Sinai War. the peninsula and the Golan Heights, territories that have been under Israeli control since the 1967 Six-Day War. Egyptian President Anwar Sadat also wants to reopen the Suez Canal. The goal was not to destroy Israel, but the Israeli authorities could not be sure of that.

On 6 October 1973, the day Yom Kippur, Egypt and Syria invaded the state of Israel. The attackers are also supported by other Arab countries: Jordan, Iraq, Saudi Arabia, Libya, Tunisia, Algeria and Morocco.

In this war, the Arabs attacked first. The Egyptians crossed the Israeli military line Bar-Lev on the Suez Canal. Israel did not expect an attack on two fronts (Egypt and Syria were

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attacking at the same time), and this made it easier for the Arab allies at the beginning of the war. Egypt, on the other hand, is armed with surface-to-air missiles that help the Arab side repel Israeli airstrikes (the losses are so great that Prime Minister Golda Meir bans the use of aircraft). Egyptian soldiers are also armed with new weapons that hit ground targets, namely, new bazookas, which can be carried in small suitcases and assembled easily.

Israel seems to be pressed against the wall when the Arab command orders troops and missiles to enter the peninsula. Then the Israeli air force discovered a shortcoming of the Soviet missiles – they have a fixed head. Jewish planes began destroying missiles more easily and with significantly less damage.

Losses:

The losses on both sides are heavy. In the Golan Heights, the losses of the Syrians were 3,500 people, and of the Israelis – 722 people (they lost 1,150 tanks, Iraq lost more than 100 tanks, Jordan – 50 tanks). Israel lost 100 tanks to the Golan, and another 250 tanks were damaged.

The human losses of the Jewish state were 2,552 people.

2. In the years before the Yom Kippur War

In the years before the Yom Kippur War, the State of Israel waged three military campaigns – the War of Independence, the Sinai War, and the Six Days War. All three of these campaigns ended with a crushing Israeli military victory. It is possible certainly to say that, from the very fact that the IDF (Israel Defense Forces) "cleared the field in battle" in these military campaigns, the political leadership and the military leadership in Israel did not believe that Israel was facing an enemy that could present it with a military challenge.

These military campaigns caused the IDF to understand what its strengths were and what its weaknesses were. The IDF reached the conclusion that is strengths were its Intelligence, Armored Forces, and Air Force, so these three components were kept in high readiness for war. All the other components of military force (reserve forces, infantry, artillery, and so on) were kept at low readiness, from the fundamental assumption that it would take time to organize them for war. The IDF acted out of the assumption that the three strong components of force would succeed in halting and repelling the enemy in every possible attack.

What the IDF did not take into account, however, is that the Arabs also understood what the Israeli strong points are, and therefore they acted to develop military capabilities that would curb these strengths. They used deception exercises against the intelligence corps (such as: compartmentalization between different units in the army, frequent exercises of the military forces), and they bought anti-tank and anti-aircraft missiles from the Russians (Sager, 2-SA, 3-SA).

After the war, it was not only Israel that learned lessons. The American military also commenced with a process of the learning of lessons and the building of a renewed force following the war. Why?

The reason was that the equipment of the Israeli military for the most part was American equipment while the equipment of the Arab militaries was Russian equipment. Furthermore, the Arabs used Russian combat tactics, which included use of Sager missiles in Sinai and massive tank attacks in the Golan Heights.

For the American military, the Yom Kippur War was a miniature version of war with the Soviet Union and the armies of the Warsaw Pact in Central Europe. They understood that the

same tactics that were used by the Arab armies in the Yom Kippur War would be used by the Russian army in a future war with the United States and NATO.

3. After the Yom Kippur War, the American military understood that it had to focus on mobile and rapid warfare against regular armies

It is important to remember that in those years the American army had completed a war of eight years in Vietnam, and there it focused on combat against guerilla armies. However, after the Yom Kippur War, the American military understood that it had to focus on mobile and rapid warfare against regular armies, an issue that had been neglected over the past decade.

While the American army was busy in Vietnam, the Russian army had greatly strengthened in Europe. In the framework of the military armament program, they accumulated a large number of tanks and upgraded their weapons. It is necessary to remember that in the past wars (until the 1970s of the 20th century), the American army had time to organize its fighters and the equipment at its disposal before it commenced the fighting on the battle field, and therefore the commanders of the American military understood that they could not withstand a rapid massive attack of the Russian army in Europe, similar to the attacks of the Syrian military in the Golan Heights.

Therefore, American generals such as William DePuy, who served as the aid of the Chief of Staff, and Donn Starry, who served as the commander of the United States Armored Army School, began to formulate a new military doctrine for rapid and mobile warfare.

One of the things that made DePuy special was the fact that he was a veteran of the invasion of Normandy and the fighting in France during World War II. During the war, he developed a professional respect for the ways in which the German army fought. Thus, one of the first things he did after 1973 was to identify the German military officers who fought on the Russian front and to share with them the ideas he attempted to develop.

In these meetings, DePuy attempted to integrate German combat methods into the combat doctrine of the American army. DePuy developed a method of fighting called "active defense". In this framework, he understood that the Russian attack method would be a large and focused attack of tanks at certain places in Central Europe that enable large attacks of tanks that would include a regular flow of reinforcements to these weak points on the front line (reinforcement of success).

Hence, DePuy identified the places that would allow a large focused attack of tanks in Central Europe, concentrated there large NATO forces, and built combat tactics that included the infliction of losses on the armies of the Warsaw Pact with gradual retreat in stages and then the flow of reserve forces that would remove the enemy from the battlefield.

The American military practiced this method of combat during the 1980s in exercises it called "War Games". However, during these exercises it encountered a problem. The forces of the Russian army and the Warsaw Pact in Eastern Europe were composed of two forces (called by the American military echelons): the first echelon was the forces of the Warsaw Pact (the satellite states of the Soviet Union) and the second echelon was the Soviet military.

The Russian strategy was that the first echelon would in essence serve as "cannon fodder", namely, it would be totally destroyed but in the framework of its fight it would greatly weaken the forces of the NATO alliance. Then, the second echelon would come and completely destroy the American forces and the NATO armies and would gallop quickly through Western Europe until the channel in France.

In every exercise in which the Americans attempted this tactic they always ended the exercise with a nuclear attack on the power centers of the Warsaw Pact in Eastern Europe, in order to stop the second echelon. This is where Donn Starry came in. Starry invented a military combat tactic that includes cooperation between the air forces and land forces, which recalled the German combat tactic of the "Blitzkrieg". This tactic was called ALB (Air-Land Battle), and it meant the cooperation between the forces of the air and the forces of the land. Starry thought of the idea of air assistance to the land forces because the commanders of the United States military deliberated the question of how to cope with the second echelon.

In addition, Starry understood that beyond the air assistance, the American military would need to base on advanced battle technologies, in order to help the American armament to be more precise in order to cope with the innovative weapons of the Russian that were discovered on the battlefields of the Yom Kippur War, such as Sager missiles and infra-red binoculars.

4. The "Shock and Awe" battle strategy

Starry's understanding led the American army commanders to understand that it is necessary to think one step further and to formulate an attack strategy that would include the elimination of all the enemy infrastructures before the enemy manages to organize forces against the American army. This understanding led to the "Shock and Awe" battle strategy. This strategy states that if you can eliminate all the infrastructures, warfare, communications, command, and control, of the enemy already at the start of the combat, through the use of a "bank of targets" you can defeat the enemy rapidly, prevent the enemy from responding, bring the enemy to a situation of powerlessness, and avoid a prolonged conflict that can be harmful socially and politically to the American public.

This strategy was developed by the American army in the 1980s and implemented in the invasions of Granada and Panama and in the First Gulf War. The Arab world, mainly after the First Gulf War, attempted to develop a counter-strategy that would harm the weak points of the Western army.

Hence, the thinking of asymmetric warfare developed. This thinking is different from most of the military doctrines in that it does not aspire to eliminate the enemy but to cause the enemy to carry out the actions that your side wants. This perception drew considerably from the elements of the guerrilla strategy that the North Vietnamese used against the American military in the Vietnam War.

The first component in this doctrine is the component of defense. Namely, the component that thinks how to survive the attack of "Shock and Awe" that is expected to come on the government and military infrastructures from the enemy. The way to protect your side against the "Shock and Awe" attack is through the element of survival. Namely, the goal is not combat against the weapons of the enemy but first and foremost how to survive the first attack. The armies of the Middle East do this from the assumption that they do not have an effective way to stop the initial attack of the enemy that is far stronger than them. Thus, for example, Hezbollah interpreted its survival against the IDF attacks as victory during the Second Lebanon War.

The way to implement in the most effective way the element of survivability is through camouflage and movement of the weapons and personnel that use them. Camouflage of the enemy's intelligence capabilities can be manifested in the concealment of weapons among the civilian population, in the use of international war laws that prohibit harm to civilians, concealment among vegetation, concealment of equipment between mountains and wadis, and so on. Movement (movement of weapons) can be expressed in the installation of wheels on

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combat equipment, the placement of weapons on railway tracks, and so on. Thus, for example, the batteries of SA-6 and SA-15 are differentiated from older systems in the placement of the wheels on the anti-aircraft missile systems to make them more mobile.

The component of the attack with asymmetric warfare is differentiated from the components of the attack in other military doctrines in its objectives. The main objective is not to destroy the fighting capabilities of the enemy but to carry out the psychological attrition on soldiers, commanders and citizens of the enemy state. The main objective is to convey a feeling to the enemy that he cannot destroy you, even if he uses all the military powers at its disposal. The goal is to cause a situation in which he will prefer to stop fighting against you following a high level of frustration with the inability to destroy you.

The tactics are small guerilla attacks over a long period time against the enemy soldiers in order to create losses and psychological fear on the part of the enemy soldiers, the prevention of victory pictures and the multiplicity of the pictures of the funerals of the enemy soldiers, the adoption of a strategy of prolonged and unending conflict, and attacks on the enemy's rear to create civilian psychological attrition and ensure the independence of units (not to be dependent on commands from a command and control system assuming they are destroyed in the initial stage of combat) and to try to influence the enemy's public opinion to convince it of your position.

Defense   **Offense**

Survival – Movement & camouflage   Psychological Attrition

To know how to fight this new combat doctrine, it is necessary to improve the existing war doctrine carried out by the Western militaries. First, it is necessary to improve the intelligence abilities of the West. It is necessary to shift from the collection of intelligence on the enemy infrastructures to the collection of more individualized intelligence on the units of the enemy army on the individual level. This is because asymmetric warfare requires every soldier to inflict heavy losses on the enemy, even at the cost of his own life.

In addition, in order to avoid harm to the small units of the strong side by the small units of the weak side, the preferred method of combat to deal with asymmetric warfare is to move all the army forces together, with mutual cover, at a small pace.

In contrast to the perception of "Blitzkrieg" that encouraged the large movement of armored forces with the cover of the air forces, in order to attack and encircle the enemy and block his retreat, the most effective way to fight against asymmetric warfare is to move all the army forces together against the enemy when there is full cooperation between the various forces striving to fight as one body.

One of the means with which a weak side learned to use for its benefit to fight a strong side is the mass media. The weak side understood that with the media he can control the information leaving the battlefield and he can change the public opinion of the strong side in his favor. A prominent example of this is the Vietnam War. In this war, the Vietnamese calculated that if they had intelligence officers who would work as local correspondents for the American newspapers, they could filter the information leaving the war and present the United States army as "war criminals" and "baby killers". While the American public primarily saw the damages of the American weaponry on the civilian Vietnamese population, it did not see the war crimes and massacres carried out by the North Vietnamese military and the Vietcong against the civilian Vietnamese population that objected to communism.

Therefore, a modern military must understand the importance of the reports in real-time from the battlefield in order to make certain that the civilian population in the country will receive the utmost information about the fighting. Today, using the Internet in general and the

social networks in particular, modern militaries are not dependent on the conventional means of media for reports from the fighting but rather have the possibility of documenting the fighting with the help of the fighters and bringing these documentations directly to the citizens of their country through the Internet and social networks.

5. Conclusion

To conclude, a very important element for coping with asymmetric warfare is the psychological strength of the civilian population. As stated, one of the ways of warfare of the weak side against the strong side is the marking the psychological sensitivity of the civilian population of the strong side as a target. A psychological attack on the civilian population can manifest itself in the launching of missiles at it, the control of its information, the multiplicity of casualties of its soldiers and the sowing of a sense of frustration in it due to prolonged confrontation.

Therefore, in a future war, strong Western armies will need to understand that military strength is not sufficient to defeat the enemy. It is also necessary to develop the mental strength of the civilian community. Since the citizens of the state who did not serve in the military in most Western countries are not accustomed to military coping, the government system needs to develop a feeling that will avoid the losses of people in a continuous conflict and even military-operative harm on the part of the enemy (such as, for example, surface-to-surface missiles) from psychologically influencing them and encouraging them to continue to support the fighting and not to protest against it in different civilian-democratic forums.

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