(ATINER)

Athens Journal of Mediterranean Studies

(ATINER)

# Volume 5, Issue 1, January 2019

## Articles

ATHENS INSTITUTE FOR EDUCATION AND RESEARCH
A World Association of Academics and Researchers
8 Valaoritou Str., Kolonaki, 10671 Athens, Greece.
Tel.: 210-36.34.210 Fax: 210-36.34.209
Email: info@atiner.gr URL: www.atiner.gr
(ATINER) Established in 1995 (ATINER)

## Mission

ATINER is a ***World Non-Profit Association*** of Academics and Researchers based in Athens. ATINER is an independent **Association** with a **Mission** to become a forum where Academics and Researchers from all over the world can meet in Athens, exchange ideas on their research and discuss future developments in their disciplines, **as well as engage with professionals from other fields**. Athens was chosen because of its long history of academic gatherings, which go back thousands of years to *Plato's Academy* and *Aristotle's Lyceum*. Both these historic places are within walking distance from ATINER's downtown offices. Since antiquity, Athens was an open city. In the words of Pericles, **Athens*"...is open to the world, we never expel a foreigner from learning or seeing".*** ("Pericles' Funeral Oration", in Thucydides, *The History of the Peloponnesian War).* It is ATINER's **mission** to revive the glory of Ancient Athens by inviting the World Academic Community to the city, to learn from each other in an environment of freedom and respect for other people's opinions and beliefs. After all, the free expression of one's opinion formed the basis for the development of democracy, and Athens was its cradle. As it turned out, the Golden Age of Athens was in fact, the Golden Age of the Western Civilization. *Education* and *(Re)searching* for the 'truth' are the pillars of any free (democratic) society. This is the reason why *Education* and *Research* are the two core words in ATINER's name.

The Athens Journal of Mediterranean Studies
ISSN NUMBER: 2241-794X- DOI: 10.30958/ajms
Volume 5, Issue 1, January 2019
Download the entire issue (PDF)

# Athens Journal of Mediterranean Studies
# Editorial and Reviewers' Board

# President's Message

All ATINER"s publications including the e-journals are open access without any costs (submission, processing, publishing, open access paid by authors, open access paid by readers etc) and are independent of the presentations made at any of the many small events (conferences, symposiums, forums, colloquiums, courses, roundtable discussions) organized by ATINER throughout the year. The intellectual property rights of the submitted papers remain with the author.

Before you submit, please make sure your paper meets some basic academic standards, which include proper English. Some articles will be selected from the numerous papers that have been presented at the various annual international academic conferences organized by the different divisions and units of the Athens Institute for Education and Research.

The plethora of papers presented every year will enable the editorial board of each journal to select the best ones, and in so doing, to produce a quality academic journal. In addition to papers presented, ATINER encourages the independent submission of papers to be evaluated for publication.

The current issue of the Athens Journal of Mediterranean Studies (AJMS) is the first issue of the fifth volume (2019). The reader will notice some changes compared with the previous issues, which I hope is an improvement. An effort has been made to include papers which extent to different issues of Mediterranean studies. Two papers are related to history; one to economics and the other to architecture – urban planning.

Gregory T. Papanikos, President
Athens Institute for Education and Research

# Athens Institute for Education and Research

*A World Association of Academics and Researchers*

## 12th Annual International Conference on Mediterranean Studies
## 15-18 April 2019, Athens, Greece

The Center for European & Mediterranean Affairs organizes the **12th Annual International Conference on Mediterranean Studies, 15-18 April 2019, Athens, Greece**. The aim of the symposium is to give the opportunity to all academics and researchers to exchange their teaching and researching knowledge and experience. You may participate as stream leader, presenter of one paper, chair a session or observer. Please submit a proposal using the form available (https://www.atiner.gr/2019/FORM-MDT.doc).

### Academic Members Responsible for the Conference

- **Dr. Yannis Stivachtis**, Director, Center for European & Mediterranean Affairs and Director & Professor, International Studies Program Virginia Tech – Virginia Polytechnic Institute & State University, USA.
- **Dr. Gregory T. Papanikos**, Honorary Professor, University of Stirling, UK.
- **Dr. David Philip Wick**, Professor of History, Gordon College, USA.

### Important Dates

- Abstract Submission: **4 March 2019**
- Acceptance of Abstract: 4 Weeks after Submission
- Submission of Paper: **18 March 2019**

### Social and Educational Program

The Social Program Emphasizes the Educational Aspect of the Academic Meetings of Atiner.

- Greek Night Entertainment (This is the official dinner of the conference)
- Athens Sightseeing: Old and New-An Educational Urban Walk
- Social Dinner
- Mycenae Visit
- Exploration of the Aegean Islands
- Delphi Visit
- Ancient Corinth and Cape Sounion

### Conference Fees

Conference fees vary from 400€ to 2000€
Details can be found at: https://www.atiner.gr/2019fees

# Athens Institute for Education and Research

*A World Association of Academics and Researchers*

**17th Annual International Conference on Politics**
**17-20 June 2019, Athens, Greece**

The Politics & International Affairs Unit of the ATINER will hold its **17th Annual International Conference on Politics, 17-20 June 2019, Athens, Greece** sponsored by the Athens Journal of Social Sciences. The aim of the conference is to bring together academics, researchers and professionals in private and public organizations and governments of Politics and International Affairs and other related disciplines. You may participate as stream leader, presenter of one paper, chair of a session or observer. Please submit a proposal using the form available (https://www.atiner.gr/2019/FORM-POL.doc).

**Important Dates**

- Abstract Submission: **18 February 2019**
- Acceptance of Abstract: 4 Weeks after Submission
- Submission of Paper: **20 May 2019**

**Academic Member Responsible for the Conference**

- **Dr. Bettina Koch**, Head, Politics & International Affairs Unit, ATINER & Associate Professor of Political Science, Virginia Polytechnic Institute and State University, USA.

**Social and Educational Program**

The Social Program Emphasizes the Educational Aspect of the Academic Meetings of Atiner.

- Greek Night Entertainment (This is the official dinner of the conference)
- Athens Sightseeing: Old and New-An Educational Urban Walk
- Social Dinner
- Mycenae Visit
- Exploration of the Aegean Islands
- Delphi Visit
- Ancient Corinth and Cape Sounion

More information can be found here: https://www.atiner.gr/social-program

**Conference Fees**

Conference fees vary from 400€ to 2000€
Details can be found at: https://www.atiner.gr/2019fees

# Augustus and the Problem of the Pax Deorum – A Case Study in Social & Religious Motives at the Birth of the Roman Empire

*By David P. Wick*[*]

*The Emperor Augustus would believe at the end of his life that he had rekindled at least a functioning image of the archaic Roman religious spirit in the major arteries of his empire and at least in his city. His contemporaries seem to have agreed that they could see this happening, even when they acknowledged it as an act of propaganda in some sort. Modern scholars have been more inclined to see through it. This study approaches the question of the 'new era' after Actium from both the viewpoints of religious anxiety in original sources and also what roles or avenues of approach the newly-named Augustus might have had to work with, politically and in popular religion or moral reform. His earliest role, as 'avenger of Caesar', would have been entirely destructive and preserved the violence of feeling that rose in the Civil Wars. Role-playing Alexander, the 'Hercules' of popular myth, even ultimately a devotion to Apollo, all seemed inadequate. Instead, his road led him to create the groundwork for an attempt at a culture-wide 'religious revival', a construct we do not normally think native to the classical world, and which the sequel to this study hopes to pursue as it unfolded in actual practice.*

**Keywords:** *Ancient Studies, Roman Religion, political/social history, Augustus, Early Roman Empire.*

## Introduction

The Emperor Augustus would believe at the end of his life that he had rekindled at least a functioning image of the archaic Roman religious spirit in the major arteries of his empire and at least in his city. His contemporaries seem to have agreed that they could see this happening, even when they acknowledged it as an act of propaganda in some sort. Modern scholars have been more inclined to see through it.

Most modern attempts, in fact, to understand what are usually called the "Augustan religious reforms" seem to begin as acts of external political or rhetorical criticism -- the dissection of public language (including public activity treated as language) diagnosed as propaganda, x-rayed by post-modernist semantics, and thinly sliced to reveal layers of subtext on the operating table. I propose in this brief study to hazard the experiment of beginning to reverse that approach. If we were to assume for the sake of argument that Augustus really valued (or had come to value) a change in the religious fabric of his times, and so watch some of his propaganda in action -- suspending our deconstructing tendencies long enough to take it on its own terms, would we understand it differently? Would we write about Augustus differently? There is a useful

[*]Professor, Gordon College, USA.

preamble for this experiment in C.S. Lewis's inaugural Cambridge address:

> "The change is this. In all previous ages that I can think of the principal aim of rulers, except at rare and short intervals, was to keep their subjects quiet, to forestall or extinguish widespread excitement and persuade people to attend quietly to their several occupations. And on the whole their subjects agreed with them. They even prayed (in words that sound curiously old-fashioned) to be able to live `a peaceable life in all godliness and honesty' and `pass their time in rest and quietness'. But now the organization of mass excitement seems to be almost the normal organ of political power. We live in an age of `appeals', `drives', and `campaigns'. Our rulers have become like schoolmasters and are always demanding `keenness'. And you notice that I am guilty of a slight archaism in calling them `rulers'. `Leaders' is the modern word. I have suggested elsewhere that this is a deeply significant change of vocabulary. Our demand upon them has changed no less than theirs on us. For of a ruler one asks justice, incorruption, diligence, perhaps clemency; of a leader, dash, initiative, and (I suppose) what people might call `magnetism' or `personality' (Lewis 1969).

## Augustus and the Problem of the Pax Deorum

In 9 B.C. the Roman province of Asia, hurried into action perhaps by the dedication of the Ara Pacis in Rome, finally got round to sending the Emperor Augustus an honorary crown. The politically active there had bandied this little idea about in the assembly for all of two decades; the occasion by now was not momentous. But with the crown came a rather more startling proposal from the Roman governor himself: the year, in those parts at least, was henceforth to begin on the birth date of Augustus. The text of presentation that accompanied the provincial crown is the usual Hellenistic servility -- men of the world gladly reduced to childlike dependence on a marvelous benefactor (Ehrenberg and Jones, Dittenberger 1905, Lewis and Reinhold 1966). The Roman governor's letter is different, thoughtful and oddly emotional:

> "We could justly hold it (the birthday of Augustus) to be equivalent to the beginning of all things, and he has restored to serviceability, if not to its natural state, every form that had become imperfect and fallen into misfortune, and he has given a different aspect to the whole world, which blithely would have embraced its own destruction if Caesar had not been born for the common benefit of all. Therefore people would be right to consider this to have been the beginning of the breath of life for them, which has set a limit to regrets for having been born" (Johnson et al. 1961, Price 1984).[1]

Augustus was faced, during the central years of his reign, with the perplexing

[1]Price is better with the details than with the feeling of the evidence he handles in my view, but has some enlightening points to make about the role of Roman provincial magistrates in personalizing and even Romanizing the Hellenic view of Augustus.

problem of changing from a 'leader' (in that sense of the word which my opening quotation used) into a 'ruler'. A leader, as long as he lives up to the demands of his trade, gives in himself definition to his followers. They are his. A ruler, on the other hand, if he is to accomplish anything must have a nation -- a people with somehow or other a definition of their own, a business to go about, a character of their own to express. When those things are dissociated from him and prove workable both the ruler and the people are far freer. He can regulate their business by the definition and judge them by it. If they stray from it he can try to recall them. They can (in theory) judge him by it as well. And all this is dependent, of course, on the definition being a livable, workable one. If the people cannot live by the definition without constantly betraying it, or alienating the gods of their experience, or being destroyed by outsiders or each other, then life is intolerable.

Octavian had been a leader. Augustus, once again, was faced with the problem of getting the Roman people to go back to being the Roman People when all the validity of that old definition seemed hopelessly discredited. Romans defined themselves by various kinds of authority and their pietas – their internal moral dedication and affection as well as their outward duty – toward it. But Roman law had lost the venerable old character it seemed to possess in the confident day of Polybius. Since the time of Sulla it seemed capable of accommodating any arbitrary conqueror's scheme of life and could change all out of recognition on a whim. Roman pietas had no longer any secure object -- Caesar, Pompey, Cicero, Brutus, Antony, Octavian all claimed real pietas was pietas toward them. They were Rome, and spoke with her exclusive authority no matter if they put their headquarters in Gaul or Greece, or began to resemble Asian demigods. Instead of the comforting old libertas (freedom because authority said one had it, and set the limits, and allowed one in return to have a certain say in the authority), there was the new liberty of a world without definition. One could, given the opportunity, do or say anything, but nothing that defined life in a world of Roman-ness was certain any more.

The young Octavian had flourished in that wild world. He rode his gift for improvisation and the practical skills of his friends to mastery of it. He also used propaganda, as the contestants in a world of splintered authority always will. But as he matured and found himself with a victory to consolidate he went through a rejection of the earlier factioned, formless era -- a rejection which increasingly resembled a religious conversion. Augustus came to be driven (often if we can trust his biographers to the point of exhaustion) by the belief that most of his world would disintegrate unless he could rebuild the life and fire in the old definition of Romanitas, put it back into his people, and make it endure. (Jeanmaire 1924, Scott 1933)[2]

[2]There was of course the Antonine alternative: a universalist, theocratic new model of empire without nationalisms or character after the imputed later fashion of Alexander. Rome was by any such scheme as likely as not to become just another province, or even a subsidiary one, for it should have to compete by less friendly rules with the sophisticated old cultures and better geo-political sites of the East. Antony and Cleopatra seem to have played this inferiority for all it was worth, as Mithridates had before them. In some sense this came true in the generations after Constantine, but my present point is how often writers on the propaganda wars often fail to note how widespread was the certainty in Cicero's day that the shift back to eastward was happening then. See e.g. Suetonius,

Propaganda (which I understand strictly in this article as *the repetition of a statement forcibly and by public demonstration until it begins to achieve actuality in the living world*) was one of his best tools. Best, first of all, because he knew it well. His propaganda wars with Antony and the assassins in the forties and thirties of the previous era are too much written about to need any reintroduction here. (Charlesworth 1933, Scott 1933, Jeanmaire 1924, Tarn 1932) Many of the articles that treat them are so interested in (and suspicious of) the fact that he won the propaganda war that they fail to notice how much he began in the end to resemble and to be defined by the things he said about himself.

Because I want to concentrate on a few central acts of belief definition, 'propaganda' if you wish, during his central reign as Augustus, I have less space here to discuss this earlier growing re-definition (I had almost said "conversion") of Octavian's character. Aside from antagonism to Antony's Hellenistic theocracy and its cult of Alexander there were, I think, three parts to it. These were, briefly:

A tension in his adolescence between the enormously charismatic, capable Julius Caesar and his reliable, neo-conservative old guardian Philippus competing for the place of what moderns call a "father figure"[3]. Caesar won the early battles (in this war of definition by auctoritas) but Philippus had the final victory. The beginnings of a turning point in this struggle may be detectable during the crucial month of April, 44 B.C., when Octavian met his stepfather and mother in Cumae on the road to Rome, and his clash with destiny. Philippus had opposed his going to Rome, and continued doubtful that any good could come of taking up Caesar's legacy. The tone with which he introduced the young man to political acquaintances in the neighborhood is significant. "Octavius was with me here;" Cicero reported, "very complimentary and very friendly. His friends called him Caesar, but Philippus did not, and so I did not either"[4]. In the explosion of popular politics that followed, Philippus remained in the shadows. His only remaining major act (of which we are aware) was a religious dedication. An interesting result of this (traceable at length in a study of its own) is Octavian's gradual movement in choice of guardian deities from Alexander (of whom Caesar made so much), to Alexander's patron Hercules as conqueror (Antony had already appropriated Alexander's other deity Dionysus), thence toward Hercules as defender of

---

Julius Caesar lii, 3 and lxxix, 3. Lily Ross Taylor suggests both stories were part of the ecumenical propaganda of Antony (Divinity of the Roman Emperor (1931), p. 3 ff, and for the coins pp. 267 ff. and p. 122, no. 15. Cf. Plutarch, Antony, 4, 26, 33, 43, 36, 60. Dio Cassius XLVIII, xxxix, 2. Appian, Civil War, III, iii. Pompeius Trogus XXXVIII, v.

[3]Philippus had been father-in-law to Cato, and one of the consuls who in 56 opposed the candidacies (and general policies) of Pompey and Crassus, only to find themselves overwhelmed in the voting by Caesar's veterans. Cicero, Ad Att. IV, viiia, 2; Ad Quint. Frat. II, iv, 6. Dio Cassius XXXIX, xxvii-xxxi. Appian, Civil War II, xvii, xviii. Plutarch, Pompey 51-52; Crassus 14-15; Caesar 21; Cato 41-42. Philippus by all the accounts attempted to prevent Octavian joining the power-struggle in Rome after Caesar's death, but also made sure he had good "republican" advice when it became obvious where his ward was heading. Velleius Paterculus II, lix-lx. Appian, Civ. Wars III, ii. On Philippus' political complexion in general, see Gruen (1974, pp. 146 f., 296 f., 334 f).

[4]Cicero, Ad Att. XIV, xii, 2.

common humanity and the human arts, (Mazzolani 1970, Dodds 1973)[5] and so to the Muses, and finally to Apollo. The last stages of this journey were very likely due to Philippus, who under the Augustan programme of temple restoration chose to build his own to Hercules and the Muses.[6] To Apollo I shall very shortly return.

Secondly, Augustus found himself defined by his role as the Avenger of Caesar. On the surface this is obvious -- Octavian needed the pose for legitimacy and respect as he built up his power in the early years. And yet wouldn't Caesar's avenger be expected to reinstate his policies to stay legitimate? Augustus was forced by his increasing belief in the romantic old values of neo-conservatives like Philippus and Cicero to opt instead for the role of avenger pure and simple. The stain of Caesar's death had to be cleansed for reasons other than the rightness of his plans for Rome. An answer to this dilemma was part of the third factor.

At the center of the things that drove Augustus throughout his life was a deep and increasing anxiety about the state of *pax deorum* -- both his and Rome's. Warde Fowler, who has seldom been bettered on such subjects, once defined this in a way that seems especially compatible with Augustus' behavior. For the purposes of this article, the phrase pax deorum will mean:

> "... -- the right relation between man and various manifestations of the Power, ... and the machinery by which it was secured was the ius divinum. We shall not be very far wrong if we say that it was Augustus' aim to re-establish the pax by means of the ius; ... the idea that unless the divine inhabitants were properly propitiated, they would not do their part in supporting the human inhabitants in all their doings and interests" (Fowler 1911: 431).[7]

Just why Augustus nurtured so primary an anxiety (and at the end of his life perhaps a pessimism) in this matter is a large question, but I offer a few brief suggestions. A person naturally prone to accident and sickness would in the classical world have been exposed to a great deal of talk about his relationship to the divinities -- it would have started young and continued throughout his life. Then, too, the antiquarian but rather Hellenized neo-conservative movement to which Philippus, Cicero and Maecenas belonged placed a high value on the piety of the rural Italians who were still scrupulous about the gods of farm and hearth. Even if the gods were figments (as Cicero seemed sometimes willing to believe) the old attitudes were conducive to those bluff, honest, frugal virtues that were supposed to have made Rome great. And the survival of those as targets of living belief in the world after Actium was perhaps evidence in turn that the gods did

[5]The trail of comparative character attributed to Hercules here can be traced through the Hellenistic and into the classical era. Cf. Cicero, de Officiis III, v, 25; Isocrates, Philippics, 109; Plato, Symposium, 177B. Seneca, de Beneficiis I, xiii, 1-3 suggests the emotional image was transmitted, still consistently, to the later Julio-Claudian world.

[6]Suetonius, Augustus, 29.

[7]Another remark from the same context is worth quoting as well, since it strikes Augustus' own maneuvering on the borderlands of divinity with a fine and unpolitical stress: "the new element [the divinity of Augustus] may be defined as in Rome (and in Italy too, as far as his own wish could limit it) nothing more than the encouragement of the belief in him, and loyalty to him as the restorer of the pax deorum", p. 438. Nothing more is claimed in the Res Gestae than that.

exist.

That same group of semi-antiquarian social critics was also conscious of a new sense of guilt or sin in the fabric of human society, real or imagined, that seems to have seeped into the air of Italy steadily since the age of Sulla and the Gracchi (Ogilvie 1969)[8]. In tumultuous times it was all very well to make heroes of suicides to principle like Cato, but it left those still living in quieter years uncomfortably aware that they had betrayed friends, or vows or principles of their own, or simply hidden away to avoid similar fates. The poet Horace, at once a distant friend of, and daring critic of, the new regime had a habit of sounding this note periodically and pointedly among his chattier and more personally reflective publications:

> Roman you will pay for your forefathers' sins
> Till you rebuild gods' temples from ruins,
> Roofs of worm-eaten oak,
> Statues filthy with smoke.
> To be below the gods your rule defends
> To this fix all beginnings and all ends.
> Gods take a heavy fee
> From wailing Italy…[9]

Augustus seems not only to have undergone a conversion of his own on matters of deity and definition of life, but to have shared with this group an interest in the general subject. The pax deorum of Rome itself needed healing. He set more store by his own initiation into the Eleusinian mysteries than one might have expected from a Roman of his public character (Jones 1970)[10]. A similar initiation, on Italian soil, appeared for the purification of the hero of the Aeneid, a poem which must have been much discussed at every stage of its composition in the Augustan circle (Fowler 1911, Mazzolani 1970)[11].

And at the end of all this were created, as its solution, the Ludi Saeculares of 17 B.C. "Games" is translation of "ludi" in this case which misses the whole significance of the phenomenon, and "festival" is not much better. My aim in the sequel study to this – the study for which this sets the stage – is to examine the attempt by Augustus to achieve the phenomenon itself by a very familiar kind of spiritual engineering. What he would achieve in fact can be followed in

[8]Even in the view of a commentor so detached as Horace: "You will pay for the sins of your ancestors [*delicta maiorum*], Romans, until you repair the ruined temples of the gods, and the images begrimed with smoke", Odes III, vi, 1. For a tangible example of Horace's worry, Nepos, Atticus XX, 3. The theme is a recurrent one in Livy, sometimes breaking into conscious "asides" (III, xx, 5; VI, xli, 8).

[9]Horace, Odes, III, vi, ll 1-8, the translation this time from P. Levi, Horace: a Life (New York, 1998).

[10]Jones also quotes, without fully catching its spirit, the stanza from the *Carmen Saeculare* in which Horace (or better Augustus, I suspect) agonizes over "generations fertile in guilt" and almost manages to drag the *lex maritandis* visibly into the worship. The bachelors of the Roman political elite, after all, were present for once.

the social history of his later reign, and the scandals surrounding names like Julia, Tiberius and Ovid are the beginnings of the critique of that achievement.

**A Note on the Purpose of This Study, Here and in the Parts Following**

Over the last, largely secularizing, century of classical scholarship the disagreements of Christian and non-Christian scholars in the study of ancient religion have been – unsurprisingly – numerous. To my eye at least, what have been far more curious have been some of the points on which Christian and non-Christian classical scholarship have seemed contented to agree.

The purpose of this study is to examine, using as lenses a series of small, related test cases clustered all round one of these interesting but seemingly non-controversial issues, and to ask whether, in the magnanimity of their agreement, scholars (including those attempting to operate from a perspective in which a culture's faith definitions taken as important or even critical rather than as distanced curios) have not missed a critical point or two in the nature of the human being, and of ancient Greco-Roman religious belief, and – particularly – in the relevance of the early Christian understanding of those two and how it has affected the way we write about, the way we think we analyze the Classical era.

The particular target on which I hope to concentrate a few experimental spotlights is that complex of beliefs, doctrines and feelings that revolve around the Christian (and covenantal Judaic or even Islamic) idea of sin – sin itself *propter*, guilt, repentance, contrition, absolution and renewal. There was a great deal of talk about these in the classical Greek, and especially the classical Roman worlds, but almost every major text on the internal religious feelings of either culture, or of the two combined, assure us that we must not understand ancient Greek or Roman religious acts or talk about these issues in Christian terms, or even in terms that Christian thinkers would find natural. "Whoever tries to measure ancient religion by Christian yardsticks will be deceive himself or retire baffled," remarks Eric Robertson Dodds in one of the classic simple pontifical introductions to the subject (and by a scholar unusually sensitive to nuances of belief in which ancient Christian and non-Christian hearts really did seem to be responding to the same things in the same way). He goes on…

"There are large areas of Christian experience which have no true counterpart in the classical age of Greece. For example, the concepts of sin and redemption, central in Christianity, are simply missing from the vocabulary of that age: there are plenty of words for 'guilt' and 'wrongdoing,' but if we translate them 'sin' we nearly always import a false implication" (Dodds 1972: 140).[12]

I could unnecessarily multiply this confident assertion with an echo from the introduction to almost any other modern text on the religious world in which Christianity first appeared. The cumulative effect on students of the interaction between paganism and early Christianity has been predictable: both Christian and non-Christian scholars generally begin somewhere close to the assumption that Christianity had first to create the sense of sin and the need for an experience of

[12]Other concepts similarly false when 'imported' into the ancient religious understanding include any concept of love between God or gods and humankind, and any internal record of religious growth in the manner of Augustine or Kierkegaard.

redemption in its audience of potential converts, and then to satisfy it once it had been created. Fundamentalist classical scholarship has often concentrated consequently on the fact of sin in the classical Roman or Greco-Roman lifestyle (frequently with luridly exaggerated details) and then emphasized the 'bully' style of preaching when it could be found among the most aggressively vocal of the early church fathers. More 'liberal' Christian scholarship has, like most post-modernist study of religion, tended toward emphasizing the aesthetic 'transformation' (a favorite word) of ancient religious feeling or experience by early Christian miracles, moral or hagiographical preaching, heroes or ritual.

Everett Ferguson, author of the most literate and nuanced recent survey of ancient religion and the environment of belief in which Christianity arose, makes – or tries to make – this lack of a sin-concept a positive distinctive in Christianity, arguing insistently that the ancient was so clueless about guilt and redemption that even penitential and regenerative rituals like the various 'mysteries' popular both in classical Greece and the early Roman empire were in their essence unconnected with 'moral renewal', and that (unlike Christian baptism) nothing in these ceremonies of purification and rebirth effected any but a few of the most intellectual pagan consciences (Ferguson 1993: 280ff).

## Conclusions

To re-examine all of that might require a book. My proposal here is more modest – to suggest we have been too quick to make those assumptions, and to look in the second and third parts of this study at a few episodes in the career of the Roman reformer and emperor Augustus as he attempted in his later career to find ways to stabilize or protect his new empire. Bearing this scholarly agreement in mind, we may find it might have startled Augustus. It should not be necessary to point out that we will be examining a period prior to (but only a fraction earlier than) the great formative events described in the Christian gospels, that we are examining a period that must have made its religious definitions and commitments without being influenced by them.

## Acknowledgements

This material written for presentation at the ATINER 13th Annual International Conference on History & Archaeology: From Ancient to Modern, June-July 2015, and revised with feedback from that presentation. My thanks to all who contributed, however informally.

## References

### *Modern References*

Charlesworth MP (1933) *Some Fragments of the Propaganda of Mark Antony.* Classical Quarterly 27(3/4): 172-177.
Dittenberger W (1905) *Orientis Graeci Inscriptiones Selectae [Corpus posts Selections]*. Leipzig: Hirzel.
Dodds ER (1972) *The Ancient Concept of Progress*. Oxford: Clarendon Press.
Ehrenberg V, Jones AHM (1949) *Documents Illustrating the Reigns of Augustus and Tiberius* UK: Oxford UP.
Ferguson E. (1993) *Backgrounds of Early Christianity.* Grand Rapids: Eerdmans.
Fowler WW (1911) *Religious Experience of the Roman People*. Fili-Quarian Classics.
Gruen E (1974) *The Last Generation of the Roman Republic*. Berkeley: University of California Press.
Jeanmaire H (1924) *La Politique Religieuse d'Antoine et Cléopatre [The religious policy of Antoine and Cleopatra]*. Revue Archéologique 19: 241-261.
Johnson AC, Coleman-Norton P, Bourne F (eds) (1961) *Ancient Roman Statutes*. Austin: University of Texas Press.
Jones AHM (1970) *Augustus*. New York: W.W. Norton & Company.
Levi P (1998) *Horace: a Life*. New York: Tauris Parke Paperbacks.
Lewis CS (1969) *De Descriptione Temporum [Description of the Times]*. Cambridge: Cambridge University Press.
Lewis N, Reinhold M (eds) (1966) *Roman Civilization*. New York: Columbia University Press.
Mazzolani LS (1970) *The Idea of the City in Roman Thought*. Indiana: Indiana University Press.
Ogilvie RM (1969) *The Romans and their Gods in the Age of Augustus*. New York: W.W. Norton & Company.
Price SRF (1984) *Rituals and Power: the Roman Imperial Cult in Asia Minor.* Cambridge: Cambridge University Press.
Scott K (1933) *The Political Propaganda of 44 - 30 B.C.* Bergamo: American Academy in Rome.
Tarn WW (1932) *Alexander Helios and the Golden Age*. Journal of Roman Studies 22(2): 135-160.
Taylor LR (1931) *Divinity of the Roman Emperor*. Ayer Co Pub.

### *Ancient References (each locus in notes as appropriate)*

Appian, Civil Wars
Augustus, Res Gestae
Cicero, Ad Atticus, Ad Quintus, De Officiis,
Dio Cassius, Histories
Horace, Odes
Livy, Histories (esp bk. III)
Nepos, Lives (esp. *Atticus*)
Plutarch, Antony, Pompey, Crassus, Caesar, Cato
Pompeius Trogus, History of Rome
Seneca, de Beneficiis
Suetonius, Augustus, Julius Caesar
Velleius Paterculus, History of Rome

# Lighting the Colossus of Rhodes: A Beacon by Day and Night

*By Robert B. Kebric*[*]

*This is one of several interrelated articles on the Colossus of Rhodes (Kebric 2019a, 2019b). Conclusions reached in those other articles, particularly one on the height of the Colossus, one of the Seven Wonders of the Ancient World, and the nature and size of any pedestal on which the giant statue stood, determined that it was at least 110 feet tall and stood on a three-tiered pedestal some fifty-feet high -- a combined height of 160 feet. These other ATINER studies also concluded that the Colossus, the largest statue in the Greek world and votive offering to Helios, God of the Sun and the island's patron deity, was located at the apex of the acropolis of Rhodes city among the island's other most sacred temples and monuments atop what is today known as Monte Smith. The latter, approaching about 300 feet in antiquity, would have elevated the Colossus some 460 feet above the sea below, and also made it an ideal "light tower" for vessels approaching and leaving Rhodes' five harbors. This study develops that idea to its logical conclusion, incorporating the latest information about such light towers on mountainous Greek islands (such as Rhodes). While there is no specific information about the Colossus as a lighthouse, there can be no doubt that Rhodes would have needed a light tower(s) on its heights from an early time. It is also logical that the Colossus would have been constructed with that purpose in mind from the start and assumed that function when built. Comparisons with the contemporary Lighthouse at Pharos, another of the Seven Wonders, and the modern Statue of Liberty, originally conceived as a lighthouse and close in size to the Colossus, are also included-- as is the reminder of the human inclination from earliest days to "light" tall structures that they build. The Eiffel tower is another more recent example. Suggestions as to how the Colossus could have functioned as a lighthouse, both by day and night, are also offered. Practical applications of expensive civic projects, especially long-drawn out ones, are also always an unavoidable consideration to city fathers of any period feeling community pressures: The Colossus was no different in that respect.*

**Keywords:** *Colossus of Rhodes, Helios, Seven Ancient Wonders, Ancient Rhodes, Chares of Lindos, Ancient "Lighthouses", Hellenistic Technology, Pharos at Alexandria, Statue of Liberty, Eiffel Tower.*

## General Overview

In a previous study on the Colossus of Rhodes (Kebric, 2019b), I concluded that the giant statue of the sun god, Helios, was situated atop the promontory now known as Monte Smith, above the modern city of Rhodes at the apex of the old city acropolis. It was also determined that the Colossus, completed around 280 B.C., was about 110 feet tall and was placed on a three-tiered base probably 50-

[*]Senior Professor of History (Retired), University of Louisville, USA.

feet tall. When its combined 160-foot height is added to the elevation of Monte Smith, close to 300-feet, the Colossus stood some 460 feet above the sea, making the tallest statue in the world also an ideal "lighthouse."

Such a lighthouse would have functioned in the same way smaller light towers once placed on Monte Smith previously had, only more efficiently—guiding arriving vessels to one of the five harbors at Rhodes City and signaling to communicate simple messages to other stations around the island. It was also appropriate that the Colossus, the embodiment of Helios, god of the sun, should continue serving into the night as a "star" in the capacity of a lighthouse.

While there is no information about the Colossus as a lighthouse, some hints may be gleaned about how it may have functioned as one by comparing it with details about the Pharos lighthouse, its contemporary "Wonder of the World" at the harbor entrance to Alexandria in Egypt. That structure would become the standard by which all subsequent lighthouses were judged ("pharos" became the Ancient Greek word for such facilities). An epigram about the Pharos by the poet, Posidippus (Gow & Page 11; Astin & Bastianini 115), whose poems place him in third century B.C. Alexandria, is very revealing because he had actually seen it in operation. His description immediately settles any question about whether or not the famous lighthouse, built during the reigns of Ptolemy I and Ptolemy II, had a great blazing flame at its top. Posidippus confirms that it did-- and adds that it could be seen by sailors all through the night to help guide their ships safely into the harbor at Alexandria.

Posidippus, from whose work one "reads the city [of Alexandria] through his poetry,"[1] also confirms for us (unless he is speaking metaphorically) that the Pharos lighthouse, whatever its appearance and size at the time, was to be identified with Zeus the Savior, whose statue, most would agree, originally graced the top of the Pharos. However, it cannot be entirely ruled out that, as had become custom, such a manifestation of Zeus at the top of the Pharos could also have embodied Alexander, his "son," after whom the new city was named-- and also Helios, the sun, with which Zeus was identified in Egypt as Zeus-Ammon. The Pharos' flame was much like the sun, venerated as the patron deity of Rhodes. In fact, a much later sixth century A.D. mosaic representation of the statue atop the Pharos clearly represents it as Helios. Since Ptolemy I was also known as "Soter," or Savior, the allusion to Zeus the Savior would also have reflected favorably upon him. The one statue could represent many identities— just as Proteus, the "Old Man of the Sea," who had traditionally first lived on the island of Pharos, was polymorphic.

Interestingly, the Pharos did not make the list of Seven Wonders until long after the Colossus had fallen in an earthquake around 226 B.C-- but Posidippus' "eyewitness" epigram, confirms several issues that might otherwise distract us while trying to discover features which might also be associated with the Colossus as a lighthouse: There was, as previously noted, a blazing fire at the top of the Pharos Lighthouse-- but Posidippus also says that it continued to burn through the night, demonstrating there was no lack of "fuel," as some have argued, to supply

[1]Acosta-Hughes (2004).

it. He further confirms that ships did, also contrary to the belief of many, continue to sail at night; and that, unlike at Alexandria, where the low profile of the breakwater necessitated building the Pharos straight up from sea at the harbor entrance, other Mediterranean seaports had positioned their "…look-out posts on a mountain, as in the islands…where ships take harbor."[2] By comparing the Pharos' blazing flame at its summit to these other port "look-out posts," Posidippus confirms for us that such watch-towers, look-out places, or other distinguished heights "on a mountain, as in the islands," had similar flames and acted as the "lighthouses" of the day.

These individual details are important for any discussion about the Colossus because, as a lighthouse, it, too, would have had a fire(s) that burned all night; guided ships safely into port; and otherwise fulfilled the same maritime role Posidippus assigned to the look-out posts located high on mountain tops— in this case, at the mountainous island port of Rhodes, second only in importance to Alexandria.

Posidippus also wrote about the Colossus. In a more recently-discovered epigram (AB 68), he says that even though the Colossus was unrivalled in size, the citizens at Rhodes had pressed Chares, the sculptor from Lindos who had fashioned it, to make his colossal statue of Helios, "Twice its size." For a contemporary writer to have mentioned both the Colossus and the Pharos in his work is a welcome and remarkable happenstance-- but while Posidippus unequivocally states that the top of the Pharos blazed with a great flame, he says nothing about any fire associated with the Colossus. That does not, however, eliminate the possibility that it, too, had been designed as a giant light tower and was equipped with one or more beacons of fire. Posidippus was talking about two different monumental structures in two different epigrams at two different times, perhaps years apart— and in two different locations some 360 miles apart. He had no reason to mention a light(s) for the Colossus because it had nothing to do with what he was saying in his epigram. What he has done for us in respect to the Pharos, however, is to demonstrate that the "technology" did exist to produce a practical and sustainable "beacon" of light at the top for its operation. Consequently, it is a certainty that Chares also knew this because evidence from Philo of Byzantium (e.g. *Belopoeica* 51.10), who also lived at Alexandria in the third century B.C.,[3] demonstrates a long-time, close technological connection

[2]The translation runs:
(I)As a savior of the Greeks, this watchman of Pharos, O lord Proteus,
was set up by Sostratus, son of Dexiphanes, from Cnidos.
For in Egypt there are no look-out posts on a mountain, as in the islands,
but low lies the breakwater where ships take harbor.
Therefore this tower, in a straight and upright line,
appears to cleave the sky from countless furlongs away
during the day, but throughout the night quickly a sailor on the waves
will see a great fire blazing from its summit.
And he may even run to the Bulls Horn, and not miss
Zeus the Savior, O Proteus, whoever sails this way.
(Translation by Dirk Obbink, University of Oxford)

[3]Marsden (1971, pp. 6-9) has established his date.

between Alexandria and Rhodes. There were also scores of individuals passing continuously between the two cities who could have provided the same technical information.

Because Posidippus clearly demonstrates in his epigram[4] about the Colossus that the citizenry of Rhodes had pressed Chares to make it even taller, an apparent impossibility, they most likely would not have been content to have it rivaled in any other way— especially by an impressive creation like the Pharos at Alexandria, Rhodes' "sister-harbor" and chief maritime rival. Twelve years of pressuring him must have taken its toll on Chares, so we can be certain that he did everything else not related to the Colossus' height to please them. That would have included whatever he knew to light it up as spectacularly as the Pharos. Just as its contemporary marvel burned brightly at Alexandria, the Colossus, standing high above the harbors at Rhodes, must always have been intended to perform the same function there. Consequently, we would argue that the Colossus was, like the Pharos, conceived from the start as a working "lighthouse," and that choice would have immediately impacted where it would have been placed: "on a mountain, as in the islands"— in this case, atop Rhodes' acropolis on Monte Smith, where the giant statue could be seen by anyone and everyone both day and night, on land and at sea.

People have always liked to light up at night the tall things that they build--doubly so at ancient Rhodes, one might suspect, for a colossal statue of Helios, who, after all, was the sun god. The Eiffel Tower, for example, the tallest structure in the world at the time, was fully illuminated on a scale never before seen for the 1889 Universal Exposition. It was for no other reason than the spectacle it provided— a declaration of French national pride. A contemporary image (Figure 1) of the Eiffel Tower shows it in its entire splendor— its spotlights focusing below on other buildings at the Exposition, while a higher beacon flashed round in red, white, and blue. The lighting technology for the Eiffel Tower, primitive by our standards, was as advanced as the day allowed. At the time of the Colossus, the only lighting available was that provided by managing some form of fire. Nonetheless, the much later Eiffel Tower is a useful example to demonstrate that no matter what the time, the cutting-edge "technology" of any age will be employed by those who are motivated to take the leap. We can be assured that Chares, too, would have stretched the boundaries of what had previously been possible to approach the "impossible" and make the Colossus a "wonder" in every way. The crowd, as Posidippus indicated, was really "into it," and Chares' statue also became a matter of "national" pride. The Rhodians probably took to heart Pindar's earlier observation in his *Olympian Odes* (7.53), dedicated in gold letters in the temple of Athena at Lindos, Chares' hometown, that the artists of

[4]Translation of Posidippus' epigram (AB 68) on the Colossus:
The Rhodians wanted to make the enormous (?) Sun
Twice its size, but Chares of Lindus set it down that
No craftsman would make a statue even bigger than this one.
If that venerable Myron reached a limit
Of four cubits, Chares was the first with his art
To forge in bronze a figure [the size?] of the earth…
(Translation by Alexander Sens, Georgetown University)

Rhodes were so accomplished that their statues looked like they were actually walking down the avenues on which they stood.

**Figure 1.** *The Eiffel Tower*

*Note: A contemporary postcard image of the Eiffel Tower after dark during the 1889 Universal Exposition in Paris. Hundreds of gas lamps lit up the Tower, while a beacon at the pinnacle sent out, with the aid of Thomas Edison's creative genius, beams of red, white, and blue to the excitement of the crowds. The Exposition's Tricolorée set the stage for the later French-American bonds associated with the Statue of Liberty, whose interior structure was also designed by Gustave Eiffel. Searchlights on tracks illuminated exposition buildings below, a revolutionary moment in the history of lighting and the birth of the familiar "Sound and Light" spectacles at sites around the world we see today. In its time, it might be suggested, the Rhodians, too, attempted something similar with the Colossus— but within the bounds of their more primitive lighting skills and for more religious and practical purposes.*

Posidippus had written in his epigram that the Pharos had "a great fire blazing from its summit," giving Alexandria the same capability that the islands, in particular, had always had to guide ships to their harbors from "look-out posts" atop nearby mountains. Such "watch towers," going back to at least Homeric days, could not communicate any distance at night except by fire. They were also used to relay simple information. No one can forget, for example, Aeschylus' weary watchman in the *Agamemnon*, posted on the roof of the palace when he sees the blazing fire shining brightly in the dark night sky from a distant beacon that signaled the fall of Troy— a primitive system of signaling at the time, but one which would later be perfected for more precise communication by the historian Polybius (10.43-47).

By 400 B.C., the summits above each of Rhodes' four cities, all of which had harbors, would have similarly been used for signaling. Upon these same heights were located temples dedicated to Athena (and also Zeus at Rhodes City). It would be difficult to argue that it was not also normal practice to use such elevations, all at the top of each city's acropolis, to set fire beacons to communicate between themselves and to guide ships at sea. Such beacons would have become more sophisticated as Greek society progressed. At Rhodes City, they would have been located at the zenith of Monte Smith, its highest elevation, which we have already offered as the best location for the Colossus. Everything at that particular location fits nicely together: a large "fire tower" that had for years guided ships into Rhodes' ever-expanding harbors; the grandest temple on the island— and, now, combined with them at the summit was built a colossal votive offering to Helios, symbolizing Rhodes' independence, prosperity, and security. Once erected, there is no reason not to believe that the Colossus replaced whatever previous fire tower(s) there was atop Monte Smith, and assumed, like the Pharos at Alexandria, its primary function as a lighted beacon to guide sea traffic into Rhodes.

If all the Rhodians had wanted to do was build a colossal tribute to Helios, they could easily have done that on top of the tallest peak on Rhodes, Mt. Attavyros, almost 4,000 feet high, sacred to Zeus, and visible on a clear day from the heights of Crete some 100 miles away. Certainly, the ultimate choice for the Colossus' location would not have been capricious-- but one that would most effectively encompass all their needs. That would necessarily exclude a harbor-side site for a light-bearing Colossus-- including the now discarded but still persistent image of the giant statue bestriding the harbor entrance that still remains a favorite for non-specialists pondering its location. However, there were five harbors at Rhodes, and each of the three other major cities also had one— all war torn from Demetrius' siege, and, in the minds of their citizenries, at least, all deserving of the Colossus being placed on their acropolis. While a harbor at the island's capital seems to us a natural choice for the giant statue, that idea may be deceptive. Local patriotism and political divisiveness ran high at Rhodes, and the initial discussion of such a matter may not have been without "noise" before the final decision was made to erect it at the capital city, the bustling hub of the island's maritime business. There, it would not only serve as a glorification to Helios, who had protected the island during its siege

by Demetrius, but also provide a shining beacon from atop Monte Smith for ships approaching any of its harbors— the single location from which such a beacon could be seen from across the channel in Caria and for miles around in every direction.

Compelling additional reasons to eliminate a harbor-level location for the Colossus are too glaring to ignore-- and two are definitive. Both Strabo (14.2.5) and Pliny, who actually saw or knew someone, who had, the ruins of the Colossus, state that they were lying on the ground. There was enough room, according to Pliny (34.18.41), for visitors to mill about and actually have contact with the statue's huge bronze remains. That necessarily means the Colossus, at least 110 feet tall (without its pedestal) had been located on an expanse of land that could still easily accommodate its giant ruined corpse. No jetty, mole, breakwater, or projection of land, natural or human made, at any of Rhodes' harbors could have accommodated such a massive amount of bronze-- especially, as it appears, for centuries after its fall. The Colossus, itself, would also have to have been very accommodating by taking care not to fall into the water when it was toppled by the c. 226 B.C. earthquake.

The other definitive reason for not erecting the Colossus directly on the sea is that it was supported by an iron (and stone) interior framework. While bronze, malleable, durable, and attractive in appearance, is especially resilient to sea water and salt filled air-- iron is not. One has only to look at one's car during the winter to see what kind of damage the salt compound put on streets to dissolve snow can quickly do to an iron alloy (steel) frame and body. Traditionally, the Colossus was said to have taken twelve years to complete. With direct exposure to salt water and moist, salty air and winds, all parts of the Colossus would have been quickly "infected." The corrosion and deterioration of the metal would have started immediately while the statue was being built. Chares, an experienced sculptor and engineer, would have known that— and avoided it.

There are other negative reasons to dismiss any of Rhodes' five harbors as candidates for where the Colossus once stood. While its bronze exterior was well suited as a metal to survive outside for long periods, its skin was very thin, perhaps penny thin. Just to keep up its luster to reflect, as much as possible, the sunlight off its gigantic body and face, it would have to have been vigorously maintained on a daily basis— also, to prevent salt and other mineral deposits from building up and getting into the "cracks" and openings in the giant figure. Interior heat buildup had to be vented, and the Colossus did have to "breathe". That would mean there would always be large maintenances crews and their lodgings and equipment about the busy harbor(s), interfering with normal traffic.

As the tallest structure on the harbor, it also would have been (as are the Eiffel Tower and Statue of Liberty, in their respective environments) a giant lightening rod, potentially drawing powerful strikes to nearby buildings and ships and starting fires. The entire waterfront could be set ablaze. Over the twelve years of construction, a harbor side site also would have blocked or impeded both military and commercial ship traffic in what was one of the

busiest ports in ancient Greece. That by itself would have made the project impossible there.

This was not a time of peace, and the recent siege by Demetrius was still in people's minds: It could happen again. The Colossus, a celebration to "victory" in the last war, could very well become the reason for subsequent defeat since its construction would have made the harbor(s) unable to respond quickly and decisively against any future enemy. Thucydides observation from a century earlier during the Peloponnesian War may be recalled (8.44.2), when the citizenry of the nearby city of Kamiros got so unnerved at just the sight of a Spartan fleet approaching their harbor unannounced, they immediately panicked and fled into the hills. What would the Rhodians have done had a valuable colossal statue been there to complicate matters?

Finally, a Colossus at the harbor holding a blazing torch or some other such "beacon light," routinely shown in early illustrations, would have been useless there. Its light would have been obscured almost immediately by the surrounding physical environment-- as can be seen today when one leaves the commercial harbor on a ship. It also could not be seen by most ships approaching the harbor until it was too late to be of any help. The beacon simply would have been too low to guide ships safety into its harbors-- especially at night. Most of same reasons can just as easily be applied to eliminate a site for the Colossus close to the harbor behind the nearby walls-- most popularly by the Palace of the Grand Master in the old city of Rhodes. That, of course, does not mean that other sizable statues described by Pliny, some colossal in size, could not have stood there and at other prominent places within the city.

These problems do not preclude a smaller colossal statue of Helios of some more resilient materials standing at one time near or at the major commercial or military harbor. In fact, it seems likely. Pliny had spoken of a number of such statues at Rhodes, but, even so, the closest he comes to a harbor side colossal figure in his discussion of colossi (34.18.39) is the much older 45-foot bronze statue of Apollo at Apollonia Pontica on the Black Sea (Bulgaria). Very recent archaeological work there, however, confirms that the statue was actually not at the harbor entrance but on an island with its temple across from the ancient city-- although the island may have once been connected to the mainland by a narrow breakwater of some sort, something like the one built in 1927.[5] However, even had such a statue(s) of Helios earlier been standing near but not on a harbor at Rhodes, it would not have fared well during the siege of Demetrius-- or any potential future attack. More wisely, the Rhodians probably followed the classic example from the Athenians, who directed their energies first toward fortifying their harbor(s), while placing their most colossal figures out of harm's way, high on their Acropolis-- where, it was said, the sun shone so brightly off the helmet and spear of the Athena Promachos (nowhere near the height of a Colossus atop Monte Smith), it could be seen for miles out at sea.

[5]See, "Balkan Heritage Apollonia Pontica Excavation Project, Bulgaria, 2017," online reference.

At almost 300-feet above the city of Rhodes and the sea, there was no better place for the Rhodians to have initially set a signal fire than on Monte Smith, adjacent to the great temple of Athena and Zeus at the summit of their acropolis— and, subsequently, to replace that early beacon with the Colossus. The advantages of the heights of Monte Smith continued to be recognized well into modern times. Once a strategic place has been identified, it is seldom abandoned. Just over the past 200 years, Monte Smith (better known to locals as St. Stephens) was used by British Admiral Sydney Smith, whose name the mount now bears, as an observation post to monitor Napoleon's eastern Mediterranean naval movements; and, in World War II, the Italians established a fortress there with large gun emplacements. What this confirms is that the peak of Monte Smith has been fortified from the start, and that, in antiquity, it would have been from the ramparts of the Rhodian defenses located there that a fire tower would have been erected— simply because it was at this particular place where it could best "see" and be seen. Unfortunately, it was for this same reason that over the millennia, a continual rain of destruction has fallen down upon the tiny plot of land, obliterating in the process (along with frequent destructive earthquakes) most signs of anything that was ever there— including the Colossus.

Still, Rhodes was an island, and even at the top of Monte Smith it can be very windy, and salt is unavoidably in the air— but at such a higher elevation, the most pressing problems that a colossal figure would immediately have faced on the harbor (and in the city) were either eliminated or ameliorated. A similar situation can be found at San Francisco, where those who live on the shore of the bay suffer more from the effects of sea water and air than those who live higher up on Telegraph Hill. Interestingly, the same 275-foot hill shares another parallel with Monte Smith since it once served as a signal hill-- in its case, as home to a semaphore that signaled the city about ship traffic entering the harbor in the nineteenth century and warned of potential dangers.

It is only logical that any previously existing light tower on the heights of Monte Smith would have later been replaced, or reconfigured, in favor of the much taller Colossus, which assumed that function in an appropriate architectural and practical fashion. Along with the Pharos, the Colossus was one of the two tallest structures of the time, rivalling even the older pyramids of Khufu and Khafre. On an island on the sea whose life blood was shipping, there is no reason to believe the Colossus would not have been used as a lighthouse. That being the case, what kind of light would have emanated from it; how would the receptacle or platform for such a light be placed on the Colossus-- whether on its "person" or nearby-- and what kind of technological enhancements were available at the time to increase the strength of its flame? Clearly, there had been much recent innovation in lighting "technology" that could also have been applied to the Colossus.

**The Hellenistic Revolution in Technology**

At the time the Colossus was built, the Greek Mediterranean world was at a crossroads of change in most every respect. Sarton's pioneering work on Hellenistic Science and Culture was among the first to prepare us to understand more fully the impact the "Alexandrian Renaissance" had on the Greek world in the last three centuries B.C.-- and, also, on what followed during Roman times. Alexander's conquests had unavoidably resulted in a new diversity of Mediterranean cultures and opened the door to many novel concepts that became centered in the particularly unique, polymath atmosphere at Alexandria. New ideas, experimentations, and Ptolemaic funding seemed to spawn innovations almost out of the ether in technology, engineering, and weapons. We know of entire cities in the past that were abandoned to the elements, such as Roman *Italica* in Spain (near Seville), where the course of the Guadalquivir River (Roman *Baetis*) changed and left the major city where both Trajan and Hadrian had been born stranded and abandoned. Seldom do we have the opportunity like the one presented by Alexandria to observe an entire new city rising from the ground up-- especially one that would become the world's first metropolis.

People, material, wealth, and every other ingredient necessary to build a great urban center quickly collected at Alexandria, and it continued to expand. If the new citizens had not been fully aware before about the long tradition of Egyptian achievements, they were now— and that included monumental architecture (on a scale largely unknown in Greece), and colossal statues preceding the Colossus of Rhodes that could "talk," "sing," and gesture-- some, like the Colossi of Memnon, through natural anomalies; others by priestly manipulation.[6]

Many things taking place in the vibrant new cultural and technological atmosphere at Alexandria could also, ultimately, have been relevant to the design and building of the Colossus of Rhodes. There was demonstrated cooperation and sharing of knowledge between Rhodes and the Ptolemies in Egypt, who had assumed the role of protecting Rhodes. Ptolemy I, "Soter," most probably earned the epithet for his help in saving Rhodes from the attacks of Demetrius Poliorcetes in 305/4 B.C. What was happening at the Ptolemaic capital was attracting the greatest engineers, technicians, and artists of the day, and also affecting how Chares might have envisioned his own work on Rhodes, especially, the building of the Colossus. Philo of Byzantium, who penned the earliest surviving compilation of the "Seven Wonders," was, among other things, a contemporary weapons engineer who had been drawn to Alexandria at the time. He plainly demonstrated the cooperation between Alexandria and Rhodes when he stated that he freely shared information and associated with "many master craftsmen in Rhodes" (*Belopoeica* 51.10). The Pharos was also being constructed at the entrance to Alexandria' harbor-- and the Museum and Library were rapidly emerging as centers for all intellectual pursuits in the

[6]La Grandeur (2012) has produced a fascinating essay on such matters.

Hellenistic world. Clearly, much information was being shared between Egypt and Rhodes.

Already, Chares had as his own mentor the great sculptor, Lysippus, who had raised colossal statues. Whatever Lysippus had done, Chares built on his example— not only in the matter of height, but also in other respects that would have made his Colossus an even more unique creation. We usually think of height alone as being the reason for the Colossus' inclusion among the "Wonders of the World"— and, to be sure, it was the tallest statue ever built. However, just the physical presence of a gigantic statue may not have been enough to earn the Colossus its legendary status. The Pharos, for example, was also tall— but did not gain that same status until centuries later.

A much-overlooked passage from Pliny is valuable in establishing that the school of Lysippus, to which Chares belonged, had become known not only for colossal statues but also for innovative ways in which to make them move. What Pliny meant when he related that Lysippus' 60-foot statue of Zeus at Tarentum in Italy could be "moved by the hand" (34.18.40) is unclear-- especially since Pliny had just noted that Lysippus had ensconced his large statue so firmly in place that the Romans had given up trying to transport it to Rome for display. Consequently, his statement cannot simply be referring to moving the statue from where it originally stood, but to its moving in place-- or moving some individual part(s)-- with apparent ease. There is no question about this since Pliny continues that Lysippus had added a column next to the Zeus to reinforce its stability, especially during storms, ensuring that it could not be dislodged from where it stood. The Romans could not do it, even though they had wished to take it to Rome.

Unfortunately, Pliny says nothing more about how the statue could be so easily "moved"-- but his tantalizing lack of description has led to speculation that some sort of device(s) inside the statue (or its base) worked by gears, counterweights, wheels, or even the kind of capstans used in siege craft that rendered the axles of the giant machines surprisingly easy to turn. Movement will always trump the traditional static pose of an artwork, especially a large one, but whether what Pliny describes was necessary to protect the statue or to move some part of it for dramatic or even religious reasons to enchant the crowds does not really matter. Lysippus had done something memorable-- and remarkable— and Chares would be criticized for not matching his own master's ingenuity. It seems a certainty that his Colossus did not disappoint.

While Lysippus had already demonstrated signs of innovations in what previously had been largely static sculpture, it was at Alexandria where Chares could turn to advance what he had learned from his mentor for ideas that went far beyond the bounds of his traditional craft. Ctesibius (c.270 B.C),[7] first of the great Alexandrian engineers, lived and displayed his mechanical genius at the same time Chares was building the Colossus-- and if, as Posidippus indicates, public pressure at Rhodes was driving Chares to exceed the known

[7]See, Marsden (1971, pp. 6-9), for the date.

bounds for sculpture of the day, Ctesibius certainly provided the Rhodian sculptor much about which to think.

Inventor, mathematician, engineer, weapons master, and more, there were few individuals who have ever influenced succeeding generations as much as Ctesibius did. The first of the great three mechanical and engineering geniuses at Alexandria was Ctesibius, his influence continuing on to Philo, his "successor," and then Hero, both of whom had no qualms about expressing their debt and admiration for Ctesibius. Ctesibius was the father of pneumatics, the use of compressed air to operate or move mechanical devices, and pioneer in its counterpart, hydraulics; and, while practically nothing remains of his writings, welcome descriptions of his revolutionary inventions were later preserved by Vitruvius in his *De architectura* (Books 9-10), which he dedicated to the Emperor Augustus. They include an early counter-weighted, adjustable mirror (presumably of polished bronze) for Ctesibius' father's barbershop at Alexandria, which could be lowered and raised as needed; the first water (and, also, pneumatic) organ and accurate water clocks; an innovative and highly-praised bronze-spring war catapult; a water screw; a water pump; and a variety of other fascinating objects.

Highlighting these latter imaginative creations were figures that could move, drink, and sing; mechanical blackbirds that could also sing; and other such amusements that were pleasing to the eye and ear that were, at the time, regarded more as "toys" for his Ptolemaic masters (and mistresses) than for any more serious application. This was partly because Ctesibius knew from where his support came, making sure to please Ptolemy's whims and desire to impress his guests; and partly because the technology (and materials) of the day restricted what was possible to do on a grander scale. It would not be the last time revolutionary concepts had to remain on the drawing board— or in the form of small models.

All of Ctesibius' inventions and ideas were early enough to influence Chares while he was building the Colossus. For his purposes, Ctesibius' advances were available to use in Chares' employment of reflective mirrors; precision use of bronze; accurate time keeping; devices that were operated through air pressure to open and close or raise and lower objects (already in use at Alexandria); music produced by water or compressed air organs; and statues that moved and vocalized, seemingly by their own will (something, perhaps, along the same lines of what Lysippus' had employed earlier in his colossus of Zeus).

It was inevitable that in such an innovative technological atmosphere--something like the early days of airplanes and cars in the twentieth century when new ideas were changing the products so rapidly it was difficult to keep up— the newest advances in technology and mechanics would also have found their way into the design and construction of the Colossus. They certainly did in respect to weapons development, where, in their own armories, the Rhodians shared the latest innovations with their counterparts at Alexandria.

Chares would not have hesitated to incorporate anything that enhanced his giant creation on Rhodes, as well as his own reputation, because such avant-

garde additions would have made the Colossus a wonder in other respects beyond its amazing height. If it moved, "talked," acted as a horologe (its huge shadow serving as a giant gnomon dividing up the day), or incorporated mirrors to reflect more intensely the light from any fire beacon associated with the Colossus, so much the better. It would also be difficult to believe that Ctesibius' experimentation with mirrors stopped at his father's barber shop door. Why would anyone have bothered to make up such a story if Ctesibius had not been involved in such research? Hero's continued interest in the theory and construction of plane and curved mirrors in his *Catoptrica* would indicate that it had not (the same can also be said about the temple doors that opened and closed through pneumatics, an innovation usually ascribed to Hero). Music provided by small organs may also have been played at appropriate times (see Figure 2).

**Figure 2.** *A Restored Pneumatic Organ Discovered Among the Ruins of the Roman City of Aquincum, Today in Greater Budapest.*

*Note:* It is our finest example of what Ctesibius' organ must have looked like in the third century B.C. A modern recreation of the original is actually playable.

## The Colossus: A Product of its Time

This discussion began with the proposal that one of the reasons the Colossus of Rhodes would have been erected atop Monte Smith, the peak of the Rhodes

City's acropolis, was that it was the only location where the giant statue could have been placed to serve in any effective capacity as a "lighthouse." Monte Smith was the highest local site from which to guide safely what would have been a constant flow of ocean traffic to-- or by, if ships were going elsewhere-- the harbors at Rhodes.

Posidippus' description of the Pharos at Alexandria leaves no doubt about its blazing flame-- but, as already noted, neither he, nor anyone else, says anything about a similar flame for the Colossus that would have taken over duties formerly performed by a light tower atop Monte Smith. There can be no doubt that there previously was a light beacon at the apex of the Rhodian acropolis, probably set on one of the city wall towers, because Posidippus indicates placing such towers on mountain tops on Greek islands was common practice. Since we are proposing that the Colossus of Rhodes was also located at the top of Monte Smith, it only makes sense that the much taller Colossus, when built, would have replaced any previous light tower as the primary pharos for Rhodes. There would be no need for two "lighthouses" at the same place.

It may be safe to say that the Colossus' service in the capacity of a lighthouse would have attracted even more attention to it and was an additional reason why it was included among the original "Seven Wonders" of the World— even overshadowing the Pharos at Alexandria, which was not in the original lists of Wonders, seemingly a glaring oversight to us. The reason may be due in part to what the Pharos looked like at the time the Colossus was finished. It was probably not as spectacular as it would be in later centuries— perhaps only a larger version of a light tower that had previously been at Pharos. By way of comparison, one typically thinks of the original Temple at Jerusalem in terms of what the impressive reconstructions of the later Second Temple must have looked like when destroyed by the Romans in 70 A.D. At the time of Solomon, however, the Hebrews were not architecturally advanced enough to have built anything comparable to the later images. Philo of Byzantium, who resided at Alexandria while both the Colossus and the Pharos stood, was not moved enough by what he saw to include the latter with the Colossus in his *De septem orbis spectaculis,* the earliest list of "Wonders" we possess. Perhaps, it was because he saw it every day, and while it certainly must have been an eye-catching structure for no other reason than it was at the entrance to Alexandria's harbor, Philo may have viewed it more as a functional building that was much too common and workman-like to be included. Unattractive smoke and soot from its large fire must also have bellowed over the new city to the dismay of residents when the winds were right. Its impressive later exterior also may not have been there at the time.

Philo liked the grand appearance of the older walls at Babylon better, which he chose to include over the Pharos in his list— perhaps because Alexander's presence and subsequent death in Babylon added to the contemporary mystery of the place. Unlike Alexander's connection in some way to all the other "Wonders" during his lifetime, the king had nothing to do with the Pharos-- other than ordering it built before his death.

There is also the lingering "tradition" that because the flame from the Alexandrian Pharos needed to be seen by ships from much further distances, it was

enhanced in some way by a mirror(s) of polished bronze— the idea being that the flame could be reflected off such a "mirror" and even direct the light in a more specific direction(s). There is no contemporary reference to confirm the use of such mirrors-- not even Posidippus-- and what references we do have about mirrors at the Pharos are from a much later date: Pliny, for example, says (36.18.83) that in his time, the uninterrupted fire from the Pharos' beacon could be seen from so great a distance that it could be mistaken for a star. That certainly sounds like an "enhanced" version of a simple fire. As is often the case, the ancient sources are silent about the things we most want to know.

Nonetheless, the fact that the Pharos Lighthouse and Ctesibius were in Alexandria at the same time would certainly make it improbable that Ptolemy would not have asked his in-house genius to "play around" with how the light from the Pharos could be enhanced. Ctesibius and the other "geniuses" assembled at Alexandria certainly would not have been idle in advancing the technology of reflected light and how best to employ it. The Ptolemies would have seen to that since their continued power largely rested on sea traffic. Ctesibius' talents could realistically have been employed to enhance the flame from the Pharos just by use of a larger version of the mirror(s) of the reputed "barber shop" variety he was credited with inventing. That it was adjustable, as was the one in the barbershop story, and moved up and down through a system of counter-weights to vary the Pharos' light, is also more than likely.

If some system of mirrors actually were employed at the Pharos, it would only have been an extension of the use of mirrors already going back centuries in Ancient Egypt. Workmen in the tombs of Egypt had long before perfected the art of "throwing light" from one place to another by using mirrors to illuminate the inside of tombs, providing light for those excavating them, and, subsequently, for those painting the tombs' interiors. Torches could never have been used because of the smoke they produced-- and they used up all the oxygen in the tomb. This system of mirrors is still in use today when tourists are shown into the otherwise dark tombs of ancient Egyptians where electricity has not yet reached. A direct beam of intense sunlight from an opening purposely cut in the roof of a darkened ancient temple or tomb can also be reflected off something as simple as one's light-colored clothing— especially white shirts or blouses.

Ctesibius would have known about this routine method of providing light from the sun by mirror relays, as would other engineers at Alexandria, and he could very well have advanced the basic concept and employed it in a lighthouse. Herodotus relates that a shield signal was flashed for seemingly traitorous intent by pro-Persian Greeks from the hills above Marathon directly following the battle in 490 B.C. --from what would necessarily have to have been an especially shined bronze surface. The episode has attracted much mixed discussion, but our only interest here is that Herodotus knew about such shield signals— which means that they did exist, and they did work.

We have an even earlier Greek example of how mirrors could have been employed in difficult engineering projects because they provide the best explanation for how the tunnel of Eupalinus on the island of Samos was excavated during the reign of Polycrates in the sixth century B.C. Even Herodotus, who did

not like tyrants, included the 3,300-foot tunnel cut through the middle of a 900-foot high hill as one of Polycrates' greatest achievements. What was especially remarkable is that workmen started simultaneously at the base on either side of the hill— and met in its middle. A short distance in from the south entrance of this tunnel are the remains of a vertical light shaft Eupalinus had cut to project a blinding ray of sunlight into his otherwise dark excavations below. It was obviously there for an important reason, and it is positioned immediately before the actual "doorway" to the tunnel proper. The most reasonable explanation is that a blinding beam of light-- in otherwise complete darkness-- hit a large mirror on a fixed base with a fixed angle that was positioned directly below it, and that mirror subsequently reflected the same light to a second in a relay of mirrors that were placed further into the tunnel as the work progressed. Theoretically, at least, all the workmen had to do was maintain the original direction by following the point of light from the mirrors. The original light source probably could not have sustained such a point of light over a long distance (in this case half the distance through the hill), so one might surmise that, as in the case of the Ancient Egyptian tomb workers, a system of relay mirrors was set up to keep the light strongly focused in the correct direction(s). The basic premise, at least, was successfully tested in the tunnel in the 1970s.

Because Eupalinus' tunnel was started on both sides of the hill at the same time, the procedure for excavating the second tunnel (now inaccessible) would have likewise been followed-- and, remarkably, with the additional use of a water level (the main reason for the tunnel was to transport water to the city) to keep the tunnels at the same height as the workmen progressed, they successfully met in the middle of the hill. Until recently, that would have been difficult for modern technology to match. Pythagoras was on the island at about the same time, but the idea that he had provided the engineer(s) with a version of the "Pythagorean theorem" to help guide the course of the tunnels has been dispelled by ground surveys around the hill, whose terrain is much too uneven for any of kind of such scheme to work. There are no other physical signs in the roof of the tunnel or elsewhere to suggest the employment of known techniques for building similar underground works, such as drainage tunnels in Egypt. On Samos today, one can still see bronze mirrors from the period displayed in the main museum.

Ctesibius, already familiar with the reflective qualities of mirrors, was available to put his own genius to work over two centuries later at the Pharos of Alexandria. For someone as shrewd as Ptolemy not to have employed him in improving the quality of light projected from the new lighthouse would defy logic. It was, after all, the single most important beacon directing the many ships coming to Alexandria with everything needed to make his new capital the greatest city in the world.

The Pharos lighthouse at Alexandria was made of stone, and at its top was a great flame that has all appearances of being enhanced by a large bronze mirror(s). Conceiving of a huge, sun-reflective, polished bronze statue of Helios at Rhodes that also acted in some manner as a lighthouse should therefore not surprise us. People have always noticed whatever there is in their environment that reflects their countenances. The most primitive people could see their reflection in pools of

water. Bronze mirrors go back to the time when someone also realized they could see their features on a bronze surface if it were polished up enough. Greek pottery is ubiquitous with representations of prosperous women at their toilet holding mirrors. Mirror factories turned out decorative mirrors routinely for local and trade consumption. A city as large as Rhodes probably had several. Alexandria, likewise— and hundreds more were all over the Mediterranean. It was already a long-established and profitable industry.

Colossal bronze statues, some already more than half the size of the Colossus, had been "in production" for more than two centuries before Chares built his giant at Rhodes-- so an industry, probably mostly slave-based, to maintain, clean, and polish such statues, had already developed. Polishing something the size of the Colossus of Rhodes was probably like painting a bridge today: the job starts over again as soon as the last brush of paint is applied. And the Colossus must have been highly polished (like the outer skin of the Egyptian pyramids) to enhance its reflective character. The resultant effect of such labor, shining in the intense Rhodian sunlight, must have been awe-inspiring-- moving any individual at ancient Rhodes to feel pride about it. Also, for anyone thinking about advancing on the island again with bellicose intentions in the unsettled period following the death of Alexander, the gleam from the sun off the statue— certainly even more impressive than the storied reflection off the helmet and spear of the Athena Promachos at Athens, must have been an intimidating reminder that the island was under Helios' protection.

Today, one can purchase polished sheets of bronze for their homes or businesses— and they, like the bronze skin of the Colossus, require attention to keep their sheen. One need only look at bronze jewelry for purchase on-line to see the bright luster that can be produced. Keeping a 110-foot bronze statue gleaming seems daunting— even an impossibility-- considering the intensive labor required. But so, too, does the building of the Great Pyramid, the earliest of the "Seven Wonders," over two millennia earlier— and it also had a polished exterior to reflect the glaring Egyptian sun. When massive work forces are available to complete massive projects, they get finished, in amazing times. This is especially true when there is a religious motivation, as there was for the Colossus, as well as a tremendous amount of community pride. At the minimum, the exterior of surviving bronze statues today, a number even rescued from the sea, reflect pleasingly off museum lights; at maximum, statues aggressively polished to a shine in antiquity by an expert labor force must have looked absolutely brilliant in the light.

The Colossus was a votive offering to the sun, a religious object, not just another statue-- and Helios did not want to be disappointed by his image. Keeping it shining would mean there would have to have been a large force of labor constantly on call. Such an on-going procedure would also have to have been carried out without invasively interfering with the daily appearance of the Colossus and its aesthetic appeal to those at home and from abroad who looked at it as a marvel and symbol of Rhodian pride and power.

The technological advancements of the third century B.C., both in war and peace, as well as the innovations for light towers, or "lighthouses," in particular,

incorporated into the construction of the greatest one at the Pharos in Alexandria, would also have accordingly advanced the technology of such towers everywhere else— especially for the busy harbors at Rhodes, where the Colossus was being built. It can therefore be proposed with some confidence that the functions previously performed by a separate lighted watch tower(s) atop Monte Smith would now have been transferred in some more effective capacity to the Colossus, and that the latter, because of its additional height, acted not only as a super light tower but also as an illuminated day and night spectacle in the name of Helios, the sun god and patron of the island.

Any fire associated with the Colossus as a light tower, however, would not need to have blazed as brilliantly as that of the Pharos because Rhodes was located directly across the channel from Caria (only nine miles across from the modern capital city) and there were other islands nearby, so its light could easily be seen by approaching ships. There were also lights from the heights of the Rhodian towns of Kamiros and Ialysos on the same side of the island by which ships could guide themselves at night. A simple but effective fire, then, may have been all that was needed, and it still would have pierced the darkness from miles away. Nonetheless, reflecting that same light using a polished bronze mirror(s) would have tremendously enhanced the light and its all-around effect, something that would have been desirable if for no other reason than spectacle. That a torch or bowl-like container would have been "built into" or attached to the colossal statue or a raised arm, as sometimes shown in illustrations, is probably unrealistic since the continual heat generated by such a blazing fire so close to the bronze skin of the Colossus would have melted its metal— or at least progressively damaged it. Soot from the smoke would also be detrimental to the statue.

Before the Colossus was even built, the system of handling fire at watch towers had undoubtedly improved to the point that, instead of climbing to the top of the tower to ignite a fire, which could be dangerous in itself, the Greeks had advanced the technology to the point that the fire could be kindled at ground level and then raised to the top of a tower, circular or squared, masonry and/or metal, by a simple system of internal pulleys or counterweights. In such manner, fire-resistant "bowls," or platforms of fire, wood or oil fueled, could be raised as simply as Pliny indicates Lysippus had made his statue of Zeus at Tarentum "move by the hand." Such a system could just as easily have been transferred to the Colossus and immediately have made it the rival of the Pharos at Alexandria. It was, after all, already perched on an almost 300-foot cliff and with its pedestal was another 160 feet high. The top of Colossus' 50-foot stone pedestal could, by itself, have acted as the station for the fire(s) in cauldron(s)-- or a large tripod(s), placed at the corners directly below the statue. Such corner decorations were not unusual on large platforms— in this case they would have been containers for fire. That would have saved the Colossus's bronze skin from damage. Perhaps even better, a separate pillar, or pillars, of fire could have been stationed, much like Lysippus had constructed a separate column a short distance from his colossal Zeus at Tarentum to help stabilize it, near the Colossus, so that there was no chance of affecting it negatively. The Colossus certainly would also have needed such an external support(s), possibly even built into its design, to provide an integral and

aesthetic appearance. Such a support could have been made of something other than bronze that could hold a long-burning fire without damage to the apparatus that held it.

Whatever the light source designed for the Colossus, it, too, could have been intensified by the employment of bronze sheet mirrors, which most likely once enhanced the flame of the Pharos. Chares, a master of his craft, would have worked out a way. His fellow citizens, especially the ones clamoring for him to do more, would have been pleased.

Any idea that the Colossus held some type of lighted torch in his raised hand or had a "bowl" of fire in front of or above his face, however, would appear to be pure fantasy. The technology of the day simply did not exist to supply a practical torch or fire on the Colossus at such a height-- and, even if it could be done, the heat from it would melt the statue's thin bronze skin. Managing the natural heat and the daily expansion and contraction it caused (especially within the Colossus), was an engineering feat by itself. There must have been many "air vents" in the Colossus' outer skin to avoid an extreme buildup of heat and to allow workers the conditions to work within its interior. (Such heat and expansion and contraction problems also affected the Statue of Liberty— as did the difficulty in sustaining her raised torch arm, which can sway as much as six inches in a strong wind.)

None of this, however, means that there was not a beacon of fire associated with the Colossus, and that the giant figure was not designed from the start to act as a "lighthouse." As already seen, illuminating tall structures has always fascinated beholders. The Eiffel Tower, while not a lighthouse, was the tallest building in the world, and it would be unrealistic to believe that it could ever have passed without some plans to light it up. The Statue of Liberty, the tallest concrete and metal structure ever built to its day, was conceived (and used) from the start as a lighthouse (although not a very effective one, it appears) to help guide ships into New York Harbor. President Grant may never have okayed the plan to place it where it is, if he had not thought it was going to serve in that capacity. Fortunately, Liberty remains fully illuminated today for other reasons— but no one could ever imagine it sitting in darkness every night. Similarly, would anyone suggest that the Colossus, along with the Pharos the tallest structure built since the pyramids over 2,200 years earlier, would not also have been "illuminated" at night-- as far as the technology of the day allowed. Rhodes was both the gateway to the Aegean from one direction and the gateway to Alexandria, the greatest city in the world, in the other. Perhaps, it was not just its size that won the Colossus of Rhodes its place on the list of the wonders of the world.

## Concluding Observations

A flame tower could easily have been conceived and erected to stand near or be attached to the Colossus. A double-iron-framed structure of basic design, hardly visible from a distance, with pulleys that could raise and lower fire platforms or pods in tandem, one replacing the other as the fuel expired to produce continuous light, would not have disturbed the statue's thin bronze

skin. Rhodes is full of pine trees to use as fuel (and also probably exported to Alexandria, where wood was scarce), but the natural commodity could be used quickly if fires were maintained throughout the day and night. The need for sustainable fuel was probably what early on sparked the idea that a lower intensity fire could be used if highly polished bronze mirrors were arranged to reflect additional light. Projecting light with mirrors was already an established fact. If the same simple procedure could also be used at night with fires providing the light instead of the sun, there may also have been mirrors situated below to reflect light off the highly buffed bronze body of the Colossus and illuminate it. Like lighting the Eiffel Tower in its time, someone as clever as Chares and the collection of other geniuses, who, like Ctesibius, were working with light refraction at Alexandria, certainly could have come up with some equivalent lighting system. There is, of course, no way of demonstrating this on the same scale, but, theoretically, the material and know how was available to enhance any light source emanating from the Colossus and also illuminate the surrounding area below it. Lights always burned continuously at religious shrines in ancient Greece— and the Colossus was, after all, a gigantic votive offering.

The ideas presented here are just that— but it is probable that some of them could have had a practical application for the Colossus. There would be no reason not to provide an illumination system for the Colossus if technically possible, and the technology to do so was advanced enough to make it so. Building the Colossus as a "futuristic" light tower would also undoubtedly have been a "selling" point to any reticent city fathers who ultimately valued profit over safety concerns. They were on an island, and they could not exist or continue to grow without expanding commerce. Most people have no idea that the Statue of Liberty was "pitched" by supporters as a lighthouse in order to give it the needed commercial attraction for financial support.

Finally, the copious supply of daily sunshine hitting the giant body of the Colossus left below on the ground a distinct shadow that could have acted as a community sun dial. It was common practice to use the shadows of huge physical objects, even mountains, as a way of keeping time. Augustus would later use a 100-foot obelisk he had brought from Egypt and placed near the *Ara Pacis* on the *Via Flaminia* to indicate the time of day. The *Solarium Augusti* functioned as a solar marker, with a gnomon whose shadow marked the time of day on the calibrated pavement below. It was the first solar monument at Rome, and on Augustus' birthday, September 23, its shadow fell directly on the center of the *Ara Pacis*. Interestingly, Eratosthenes, the man who produced the first realistic measurement of the earth's circumstance, was heavily involved at Alexandria with gnomons measuring the sun's shadow during the same period Ctesibius was active there-- and while the Colossus was standing.

Blazing light tower fires, bronze mirrors, precision time calculation, and statues with moving parts that "spoke," sang, and played music— they, as well as other innovations just as fantastic to onlookers, were all part of the cultural fabric of the day. The ability to incorporate any or all of them in the Colossus of Rhodes while it was being built was unquestionably there. And the only

location on Rhodes where most, if not all, of these things, along with the Colossus' incredible size, could be most effectively accommodated was high above the city on its acropolis at the apex of Monte Smith.

## References

Acosta-Hughes B (2004) 'Alexandrian Posidippus: On Rereading the GP Epigrams in Light of P.Mil.Vogl. VIII 309' in *Labored in Papyrus Leaves: Perspectives on an Epigram Collection Attributed to Posidippus (P.Mil.Vogl. VIII 309). Hellenic Studies Series 2.* Washington D.C.: Center for Hellenic Studies. Online version.

La Grandeur K (2012) 'Robots, Moving Statues, and Automata in Ancient Tales and History' in Carol Colatrella (ed) *Critical Insights: Technology and Humanity*, Amenia, NY, USA: Salem Press.

Kebric R.B (2019a) 'The Colossus of Rhodes: Its Height and Pedestal' *Athens Journal of Humanities and Arts* (forthcoming)

Kebric R.B (2019b) 'The Colossus of Rhodes: Some Observations about Its Location' *Athens Journal of History* (forthcoming)

Marsden E.W (1971) *Greek and Roman Artillery Technical Treatises*, Oxford: Oxford University Press.

# The Grand National Assembly of Turkey and its Architectural Representation as a Memory Space

*By Nazlı Taraz[*] & Ebru Yılmaz[†]*

*In 1937, a national architectural competition was held for the construction of the third assembly building of Turkey with a brief invitation text by saying "we need an assembly building which symbolizes the continuity of the monumental Republic of Turkey and which overlaps the contemporary architectural trends of our era in the 20th century" (www.kultur.gov.tr). With the praises and emphasis on the monumentality and stability of the Republic, the competition text plainly declares the national presence of the country in the 20th century stage and expecting architectural manifestation of modernity and durability of the Turkish nation in its fundamental administrative building. In this way, the ideological objectives and the nationalist goals embodied in an architectural space representing the independent and monumental existence of Turkey in its assembly building as the memory space of the Republic. From this perspective, this paper aims to handle the Grand National Assembly of Turkey as the official and architectural representation of Turkish national identity by focusing on its construction process beginning from the competition phase, its completion in 1961 and the symbolic details representing the long-lived existence of the nation from the history onwards. In order to discuss the GNAT as the memory space of the Republic, discourse analysis will be used by intertwining the collective memory and national architecture discourses in the Early Republican Turkey. In this context, architectural written media such as periodicals, newspapers and articles on national architecture discourse in the Early Republican Period will be used in addition to the archival research on the last assembly of Turkey. In this way, the last and contemporary assembly building of Turkey will be studied as a physical representation of Turkish national identity construction process and its concretization within the national architectural understanding of the mid-20th century.*

**Keywords:** *Grand National Assembly of Turkey, Assembly buildings of Turkey, Memory Space, National Identity, Early Republican Period*

## Introduction

From the history onwards, the desire for the territorial dominance and national sovereignty resulted in destructive actions of states by ruining of city centers housing religious, historical or national symbols. In the recent memory of the world, the two world wars and contemporary regional attacks have unfortunately become traumatic phenomena addressed to the destruction and demolition of monuments as the long-lived storages of memory and the historical knowledge of a nation. With a brief glimpse on the recent past, the historical sites of Palmyra, Aleppo and Raqqa are amongst the most destroyed lands in the first quarter of the 21st century with attacks to the religious and public cores of the cities. Previously,

[*]Research Assistant, İzmir Institute of Technology, Turkey .
[†]Associate Professor, Izmir Institute of Technology, Turkey.

the World War II resulted in a comprehensive destruction in European cities such as Berlin, Florence, Dresden and Aachen with regional attacks to the historical monuments date back to the ancient times of their national history.

At the beneath of these subversive activities, the historical sites and the urban monuments have intentionally chosen as physical symbols carrying the traces and memories of the long-lived existence of a society, city or a nation in a larger scale. In this way, the more historical structures –buildings, monuments, squares or statues- are destroyed, the more damage is caused in the memories of a land. By physically destroying the memory spaces of a nation, it is aimed to destroy the collective memories and historical milestones specific to a place which transforms a land into a homeland. Thus, alongside all the destructive and tragic consequences, the ongoing agenda raises awareness to reconsider our cultural values and national symbols in our country which are accepted as living-witnesses of the centuries old civilizations from the history onwards.

Unfortunately, in 2016, Turkey has also faced with a threatening regime attack which resulted in destructive activities in different regions of the country, especially in Ankara and Istanbul. Amongst all the destructions, Turkey was heavily wounded from its national core with more than one bombings to the Grand National Assembly. In this way, it is aimed to endanger Turkish national existence with destroying its one of the most important symbols in the urban context which was constructed as the national representation of the Turkish Republic in the first half of the 20$^{th}$ century. On that occasion, these tragic events resulted in re-thinking on nation and national memory concepts with a special emphasis on the Grand National Assembly as the living proof and living witness of the Republican memories of Turkish nation.

Looking back to the 1937, when a national architectural competition was held for the construction of the third assembly building of Turkey, the brief invitation text declared "we need an assembly building which symbolizes the continuity of the monumental Republic of Turkey and which overlaps the contemporary architectural trends of our era in the 20$^{th}$ century." With the praises and emphasis on the monumentality and stability of the Republic, the competition text plainly reflects the national presence of the country in the 20$^{th}$ century stage and expecting architectural manifestation of modernity and durability of the Turkish nation in its fundamental administrative building.

In this way, it is aimed to embody ideological objectives and the nationalist goals in an architectural space representing the independent and monumental existence of Turkey in its assembly building of the country. From this point of view, this paper aims to investigate the Grand National Assembly of Turkey (GNAT) as one of the *memory spaces* of the Turkish national identity which carries the memories of the Republic and its representation in the urban context from its architectural competition phase to the completion in 1961 by staying in use until today.

## Concretization of Memorialize: Memory Spaces

In order to provide a better understanding for memory space discussion on the last assembly building of Turkey, examining memory discourse from different perspectives is found precious to understand how memory and its collective formations can lead to the construction of a national identity specific to a society. Thus, this paper begins with discussing the spatial representations of collective memory which have risen especially after the term "memory spaces" introduced by the French philosopher Pierre Nora in the beginning of the 20th century. Up to that time, Maurice Halbwachs and David Lowenthal became key-figures in collective memory discourse by making certain demarcations and classifications on memory and its recollection channels individually and collectively.

To start with the French philosopher Maurice Halbwachs' *On Collective Memory*, the author handles collective memory as a continually changing concept depending on individuals and reads "collective memory is not a given but rather a socially constructed notion" (Halbwachs, 1992). In this respect, Halbwachs proposes three ways for memory recollection. Firstly, memories are transferred within families and close friends while we are growing up in a society. In this way, secondly, society emerges as a powerful setting in feeding and organizing our memories in minds within the physical environments that events occurred. Lastly, memories recollected instinctively by individual him/herself (Halbwachs, 1992). Accordingly, these three different recollection ways are re-shaped and re-organized in accordance with societies and physical environments as spaces of memories.

In a parallel vein, in *Past is a Foreign Country*, historian David Lowenthal begins his argument by asking "how do we come to know about the past?" and classifies the sources of past knowledge as memory, history and relics (Lowenthal, 2005). Accordingly, "memory is inescapable and prima-facie indubitable; history is contingent and empirically testable" for Lowenthal (Lowenthal, 2005). Although the author makes a demarcation between memory and history, he also emphasizes that the boundary between these two sources blurs continually by reading "uncertain where memory ends and history begins, we often attribute to one what comes from the other, jumbling early memories together with stories later heard and read, much as oral narrative conflates recent recollections with tales immemorially told" (Lowenthal, 2005). As the third source of past knowledge, relics are handled as concrete mnemonic symbols of the past in natural forms or artefacts (Lowenthal, 2005). In this way, they come to the forefront as the physical representations and living-witnesses of the history and collective memories of societies. Thus, all kind of architectural remains, buildings or artefacts in the urban context become invaluable storages for memory which are successfully endured to the destructive effects of passing time.

In a parallel vein, in *Memory and Architecture*, art historian Eleni Bastea asserts that architecture is an important medium which concretizes humanitarian values within spaces and stages to live (Bastea, 2004). By discussing the spatialization of shared values and collective memory of a society, Bastea uses the term "memory's voice". Accordingly, memory becomes an active voice in shaping

our current lives by carrying the traces of the past. On the grounds of these cumulating traces of our histories, collective memory of a society constitutes a continuous ground for identification, remembrance, recollection and memorialization (Bastea, 2004). Thus, architecture emerges as a physical shelter for these activities in the urban context by physically concretizing memories into living spaces and experiences through spaces, representations and symbols.

Handling architecture as physical artefacts for keeping memories of a society is firstly introduced with the term *memory spaces* in 1984 by the French philosopher Pierre Nora. Accordingly, *Hafıza Mekanları* (originally published in French, *Les Lieux de Memoire*, 1984) Nora handles certain architectural components as memory storages of a nation which are concretized physically in the urban context by representing specific meanings or shared values in societies. From this point of view, Nora mentions archives, museums, mausoleums and national celebration spaces and buildings as *memory spaces* which are intentionally constructed artefacts for declaring and propagating revolutionary circumstances in cities (Nora, 2006).

Focusing on the memory and its collective formations, Nora emphasizes that collective memory is a convertible concept that leads to the construction of national identity in a society (Nora, 2006). In this respect, memory is handled as a "framework" for nations which can evaluate in accordance with its use in certain strategies such as national connotations, constructions or commemorations and celebrations for different purposes (Nora, 2006).

Accordingly, nation and its national identity become observable and representable notions are concretized in architecture through spatial organizations and their functional uses in certain intentions. In this way, *memory spaces* act as "laboratories" where the memorization is re-produced, re-formed and re-presented in specific places and in specific procedures (Nora, 2006). Thus, *memory spaces* are intentional constructions in the urban context to escape from the traces of a former society by declaring and propagating new characteristics of a new nation. By calling these construction activities as "reification of memory", Nora emphasizes that architecture emerges as an active actor in the spatialization of collective memory and its national formations in societies (Nora, 2006).

## Memory Spaces of Turkish National Identity: National Architecture Discourse in Turkey

To piece together the different perspectives of Halbwachs, Lowenthal and Bastea, Nora's *memory space* discussion emerges as a significant unifier by evaluating the symbolic role of architecture in memorialization through physical spaces and their collective representations for nations. Thus, in this paper, the representational role of architecture in national connotations is specifically discussed upon the national architecture discourse of Turkey in the first half of the 20$^{th}$ century. From this perspective, the First and Second National Movements of Turkey are investigated and the Grand National Assembly is handled as one of the most important *memory spaces* of the Republic.

The transformation process of the Anatolia from being the lands of Ottoman monarchy to the Turkish Republic brought about radical changes in society from the beginning of the 20th century. Within this framework, urban transformations were held by constructing new public buildings and institutions in order to declare and propagate new democratic Turkey to the world stage. Moreover, Ankara became the showcase of the Republic as the capital and leading modernization steps were initially paced through the new architectural context of the city. In line with this purpose, each step towards democracy physically embodied in architectural spaces in the capital by carrying special symbolic meanings which focused around the new republican national identity of the country.

In *The Making of Modern Turkey*, historian Feroz Ahmad elaborates the establishment of Republic and the construction of Turkish identity via the political and historical context of Turkey and emphasizes that Turkey is not a re-built version of the Ottoman Empire but a completely constructed new country of the Kemalists (Ahmad, 1993). In order to propagate the construction of the new identity, Young Turks were active in every field of the political and cultural context by advocating the idea that the former monarchy of the Ottoman Empire had to be abolished for the establishment of a "secular republic" (Ahmad, 1993). Similarly, Ayşe Kadıoğlu mentions Young Turks as the leading group for the new Turkishness ideal with the leadership of Ziya Gökalp by proposing the national identity and cultural structure of the Turkish nation had to be directly arisen from the "Turkish folk culture."

On the one hand, Gökalp outlines "civilization" as a progress which can be learned from the West, on the other hand, the "culture" and "identity" had to be strictly connected to the own folk of the nation itself (Kadıoğlu, 1997). In a parallel vein, in *Modernizm ve Ulusun İnşası* (originally published in English – *Modernism and Nation Building: Turkish Architectural Culture in the Early Republic*, 2001), architectural historian Sibel Bozdoğan focuses on the late 1930s when the Republican People's Party (RPP), as the party in power, declared a new understanding of history which rejects the Ottoman past and insists on creating a new "Turkishness" with its own national history (Bozdoğan, 2012).

Thus, in order to construct a new national identity, the RPP, Young Turks and intellectuals aimed to ground a new Turkish identity on a Turkish past which was separated from those of the Ottoman. Following the new reformist Turkish manner, nationalist movements were accelerated with a search for a national history, identity and its architecture as physical representations of the nationalist goals in the urban context. In this way, the modern architecture became an instrument which creates its own architectural language by smybolizing the new national identity of the country (Bozdoğan, 2012). A new national memory and its identity were produced via the modern public buildings especially in governmental offices, party buildings, post offices, museums, national libraries and archives as concrete symbols of the newly constructed Turkish Republic. Also, commemoration ceremonies, monuments and statues of succesful political figures of Turkey became important tools for constructing and symbolizing the new national identity and its national memory.

In her dissertation "Making a National Architecture: Architecture and the Nation-state in Early Republican Turkey" (1998), architect and architectural historian Elvan Ergut comprehensively handles the conceptualization of national architecture by discussing the nation-building as a process instead of an end product, which can be represented through architecture. Mainly criticizing the general attempts to formulate the national architecture and nation-building as stable concepts which the latter was represented by the former, Ergut emphasizes that nationalism as a process "creates, invents, imagines, and construct nations" (Ergut, 1998). By placing nation-building process at the center, Ergut establishes correlational links between cultural, social, political and economic contexts with the national architecture. Thus, the architectural products are handled as meaningful entities which are produced and at the same time, produce the national representations in the urban context (Ergut, 1998).

On the one hand, Ergut highlights the idea that nation-building and its architectural representations are synchronous and interacting notions, in *Cumhuriyet Dönemi Türk Mimarisi* (Turkish Architecture in the Republican Period, 1996), art historian Metin Sözen handles architecture as a product of changing contexts and establishes his nationalism discussion on the remarked phases of architectural evolution of Turkey in the first half of the 20$^{th}$ century. Handling architecture as the products of the national identity construction, Sözen looks backwards and begins his national identity discussion by marking the Second Constitutional Era (SCE) in 1908 and the First National Style as the beginning of the nationalism movements in architecture. During the following decade of the SCE, Sözen mentions increasing Turkism idea which was tried to be integrated all social and cultural networks of the country (Sözen, 1996). On the one hand, a search for a new national attitude was continuing by the Turkish architects, on the other hand, there was a remarkable tendency to re-interpret Ottoman details within the name of the First National Style (Sözen, 1996).

In a similar way, architectural historian İnci Aslanoğlu evaluates architecture in Turkey as an active part of changing contexts which lead a new understanding towards Turkish nationalism by advocating the idea that "architecture is not an isolated entity in itself" (Aslanoğlu, 2010). Accordingly, by focusing on the changing political, socio-cultural and economic contexts of Turkey, Aslanoğlu constructs her discussion on the changing architectural manner of the country in two main historical periods in 1920s and 1930s. Although the circumstances are highly different in these periods, both have similar underlying reasons in declaration and propagation of the new Turkish national identity. On the one hand, the author defines 1920s as "the years of shortage" when the destructive effects of the war were tried to be healed and Ankara was re-constructed as the new capital of the Republic; the 1930s is defined as a period when the new architectural attempts were tried in public and private constructions (Aslanoğlu, 2010).

In 1920s, Aslanoğlu's first classification corresponds to the First National Style in Turkey when the "history-based" architectural manner is used to declare newly introduced nationalism attitude in the built environment (Aslanoğlu, 2010). Accordingly in the First National Style, the Ottoman revivalism is highly used to provide a connection with the historical background of the country and at the same

time, to represent the uniqueness of the democratic republican understanding in monumental scales (Aslanoğlu, 2010). In a parallel vein with Aslanoğlu, Bozdoğan handles this period as the first steps towards a new architectural language and construction techniques in Turkey beginning with the Ottoman revivalism (Bozdoğan, 2012). On the one hand, the architectural products of the First National Style had the characteristics of Ottoman architecture, on the other hand, new design principles and the use of new construction materials were combined in a modern way.

Ideologically and politically determined principles of the First National Style were applied mostly in Ankara as the capital of "the new Turkish nation." As the first building of the style, the office building of the Committee of Union and Progress (*İttihat ve Terakki Cemiyeti*), was built in Ankara in 1917 by Salim and Hasip Bey and then, the building was converted into the first national assembly of Turkey in 1920 as the concrete declaration of the transition from monarchy to democracy at the heart of the capital city (Bozdoğan, 2012). By housing the rapturous periods of the newly establishing Republic, this building became the core of the nationalist movements in the first quarter of the 20$^{th}$ century.

In 1924, the administrative core was moved to the Second Assembly of Turkey, which was designed as the office building of the Republican People's Party by the architect Vedat Tek. Then, the first national assembly was began to serve as the Headquarter of the Republican People's Party building and law school up to its conversion into the Museum of Grand National Assembly in 1961 and the Independence War Museum in 1981.

From its opening in 1924 to the completion of contemporary assembly building of Turkey in 1961, the second assembly of the Republic became a concrete representation of Ataturk's principles and reforms, contemporary trends and nationalist movements. In the opening ceremony of the second national assembly, a striking opening speech was made by reading "… the new Turkey state is a people's state, but in the past, it was a state of one person… The grand thought movements which rescued the certain societies from captivity and liberated them are the archenemies of people who relied upon obsolete institutions and decayed regimes… The new Turkey state is the representation of this grand idea which dominates the world and a realized example of its actualization" (www.tbmm.gov.tr).

In this way, the nationalist manner of the time and its architectural symbolization in the urban context was publicly declared and propagated upon the second assembly building of the country. After to the opening of the third and contemporary assembly in 1961, the second was converted into the Museum of Republic in 1979, which has been stayed in use until today.

At the end of the 1920s, counter-views on the First National Style began to emerge upon the idea that the Ottoman revivalism was an outdated fashion which had to be abandoned in order to reach a modern architectural under-standing based on functional and rational approach (Bozdoğan, 2012). These rejections increased rapidly and in 1930s and, the First National Style was abandoned with a counter movement: the New Architecture. In order to create a new understanding in architectural language representing the Turkish nation, the local architects

advocated the idea that the ongoing Ottoman-revivalism has to come a halt and a new modern, functional and rational architecture is needed to propagate Turkishness on the world stage.

Overlapping with Bozdoğan, Aslanoğlu classifies this period beginning with the International Style, to the Neo-Classical Style and finally ends with the Second National Style (Aslanoğlu, 2010). Accordingly, the main reason for this three-staged progress, Aslanoğlu mentions the co-working of the foreign and local architects to construct national architecture of the Republic (Aslanoğlu, 2010). On the one hand, the foreign architects, such as Giulio Mongeri, Ernst Egli, Bruno Taut and Martin Elsaesser, etc. preferred the monumental architectural style to propagate nationalism, the Turkish architects used western-focused rational and functional attitude in architecture. In this way, monumental, symmetrical and highly decorative attitudes of the First National Style was replaced by purist, simple and functional architectural manner in the International Style (Aslanoğlu, 2010). As Aslanoğlu stresses, the International Style was realized with concrete skeleton systems, plain roofs, cubical masses, asymmetrical volumes which were organized with the form-function relationship (Aslanoğlu, 2010). Especially in this period, Sedad Hakkı Eldem contributes greatly to the International Syle in Turkey with residential and storage buildings (*Bayan Firdevs Evi* and *SATİE Storage*) in İstanbul (Aslanoğlu, 2010).

Secondly, the Neo-Classical Style became another main architectural tendency in the 1930s. At that time, not only Turkey but also the other countries in the world, such as France and Germany, widely used the monumental representation of the Neo-Classical style in their architectural products to declare their states' independence and freedom via the gloriousness of the built environment. Thus, the majority of the monumental Neo-Classical buildings were the products of the foreign architects who were invited to participate in the establishment of the new architectural language of Turkey, while the functional International Style was generally preferred by the Turkish architects (Aslanoğlu, 2010). However, Şekip Akalın's *Ankara Station*, Bedri Uçar's *Turkish State Railways Building* and Sedad Hakkı Eldem's *Inhisar General Directorate Building* are amongst the leading examples of monumental Neo-Classical understanding of the time designed by the Turkish architects (Aslanoğlu, 2010).

As a result of the major domination of the foreign professionals in the Turkish national arhitecture, the Second National Style was emerged as a common reaction to the activities of the foreigners in the late 1930s. Aslanoğlu explains this phase of the architectural search of Turkey as an escape from the foreign influences in national architecture and the will to prove the sufficiency of Turkish architects to declare new Turkish identity in their own architectural products (Aslanoğlu, 2010). Although the architectural manner is generally focused on the products of Turkish architects, the existing circumstances on the construction and design techniques resulted in involuntary collaboration with foreigners. Leadingly, the Austrian architect Clemens Holzmeister became one of the most important architects of the Second National Style in Turkey by designing the ministry buildings of *Defense, Interior, Public Works* and *Presidency of the Judicial Council* in Ankara, additionally to his public building designs in the city.

At this time, the most popular architectural publications of the era – journals of *Mimar*, *Mimarlık* and *Arkitekt* – become significant indicators of ongoing discontent on "foreign architect admiration" through the articles of well-known Turkish architects and planners. In his detailed book on the foreign architects problem in Turkey, architect Gürhan Tümer compares positive and negative reactions on the collaborations with foreigners in the Republican period by analyzing the articles of the time. While a group of administrators, architects, planners and media professions were supporting the productive atmosphere of the co-operations with foreign architects, a remarkable group rejected the dominant influence of foreigners in the built environment. Basically regarding the cultural concerns in discussion, the opposite group advocates the idea that a national architecture of a country could only be properly realized by its own citizens (Tümer, 1998).

As amongst the vigorous advocators of Turkish architects in national discourse, architect Abidin Mortaş expresses his discontent by saying "we are not engaging in a mere nationalism demagoguery. We are justifiably advocating that it is necessary to be proud of the products of a well-educated Turkish group, instead of blindly and uncomprehendingly appreciating all foreign works in this country..." (Tümer, 1998). Similarly, another well-known architect of the time, Şevki Balmumcu argues the journalist Falih Rıfkı Atay's positive opinions on the foreign collaborations by writing "we are inviting Falih Rıfkı Atay for making a proper analysis and observation on the situation we are in... Then, of course, he will understand the circumstances and write again..." (Tümer, 1998).

In brief, the comprehensively changing political and socio-cultural context of Turkey in the 20$^{th}$ century physically manifested itself in the built environment which was shaped under the effect of multiple perspectives on modernity, nationality and its architectural representations in the urban context. Especially Ankara became one of the most important stages of the new nationalist attitude in the country by representing the new Republican identity of Turkey as the capital city. Long-standing searches for the construction and representation of the Turkish nationalism concretized in architectural spaces of the capital especially beginning with the First National Style in the early 1920s. Then, the architectural manner evolved and developed with the followed-up styles with the participation of important foreign architects of the time. In 1930s, the Second National Style emerged as the representation of a more settled and embraced nationalist attitude in the built environment with its own structural language and representative symbolism.

In comparison with the transition atmosphere of the 1920s, the more established and stable nationalist manner of Turkey in the 1930s needed a new administrative core which carries all the modern and reformist symbols of the Republican identities. Thus, the government decided to declare, propagate and represent its grandeur national existence and stability via its official administrative building by symbolizing the established democratic regime and its citizens as the primary actors of the Republic. Within this purpose, an international design competition was held in 1937 with a brief invitation text declaring "we need an assembly building which symbolizes the continuity of the monumental Republic

of Turkey and which overlaps the contemporary architectural trends of our era in the 20th century" (www.kultur.gov.tr).

## Representation of a Nation in the Urban Context: The GNAT and the Ministries Quarter

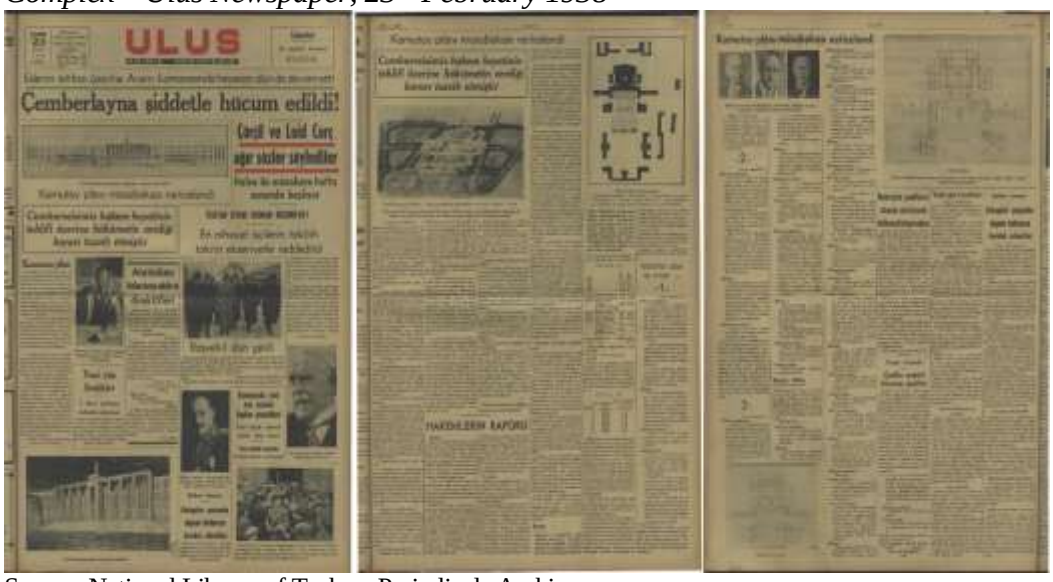
As the product of a foreign architect in the Second National Style, the Grand National Assembly of Turkey (GNAT) was designed by the Austrian architect Clemens Holzmeister in 1938 and, after its completion in 1961, the building has stayed in use up today. In addition to the invitation text, the competition committee declared the necessities for the assembly as "the competition aims to construct a monumental representation of the Turkish Republic in the 20th century stage which has to symbolize the perfect and pure manner in architectural style, in addition to its grand and detailed programme" (*Yarım Asırlık Meclis Binası: 51. Yıl* , 2012). In contrast to the first two assemblies of Turkey, the GNAT became the first administration core of the country which is constructed as an assembly from the beginning (To make it clear, the first assembly was formerly used as the office buliding of the Committee of Union and Progress and similarly, the second was used as the office of the Republican People's Party before its use as the second assembly of Turkey.). In the January of 1937, the international competition was declared with the decisions of the Chairmanship Council (*Riyaset Divanı*) and GNAT Presidency Council - Competition Commission (*TBMM Başkanlık Divanı Yarışma Komisyonu*) with the jury members, W.M. Dudok from Holland, I. Tengbom from Sweden and H. Robertson from England (*Yarım Asırlık Meclis Binası: 51. Yıl* , 2012).

In the January of 1938 (see Figure 1 for the announcemnet of the winning project), Holzmeister's project got the first place and the construction was began in 1939 up to the the obligatory break in 1941 when the World War II affected all the countries with the limited work force due to the large-scale economic and political crisis (*Yarım Asırlık Meclis Binası: 51. Yıl* , 2012). After a year, construction began again with a detailed division of labour consisted of Turkish, English and Swedish architects, engineers and contractors. Additionally, the architect Ziya Payzın, who was the student of Holzmeister at the time, was also charged with the detail drawings of the project (*Yarım Asırlık Meclis Binası: 51. Yıl* , 2012). Then, in 1948, Payzın was fully tasked with the supervision and control of the project up to the completion. Before its opening as the assembly, the GNAT was firstly used for the meeting space of CENTO (The Central Treaty Organization) in 1957 and four years later, the building was officially opened as the last and contemporary assembly of Turkey (*Yarım Asırlık Meclis Binası: 51. Yıl* , 2012).

By keeping in mind briefly the chronological history of the GNAT, it has also vital importance to understand the symbolic representation of the campus in the urban structure in a larger scale. As mentioned previously, the nationalist manner in the newly established Republic manifested itself in the built environment through architecture and its iconographic representations in the urban context, especially in the Ankara as the capital. In a parallel vein, the city has passed an

overall re-construction process to become the new and modern core of the Turkish Republic, which comes into existence independently from the centuries old center of the country, İstanbul. Thus, within the frameworks of the new necessities of a Republican capital city, the urban scale re-organization of Ankara was firstly realized by the German architect Carl Christopher Lörcher in 1924.

**Figure 1.** *Announcement of the Winning Project for the Grand National Assembly Complex – Ulus Newspaper, 23rd February 1938*



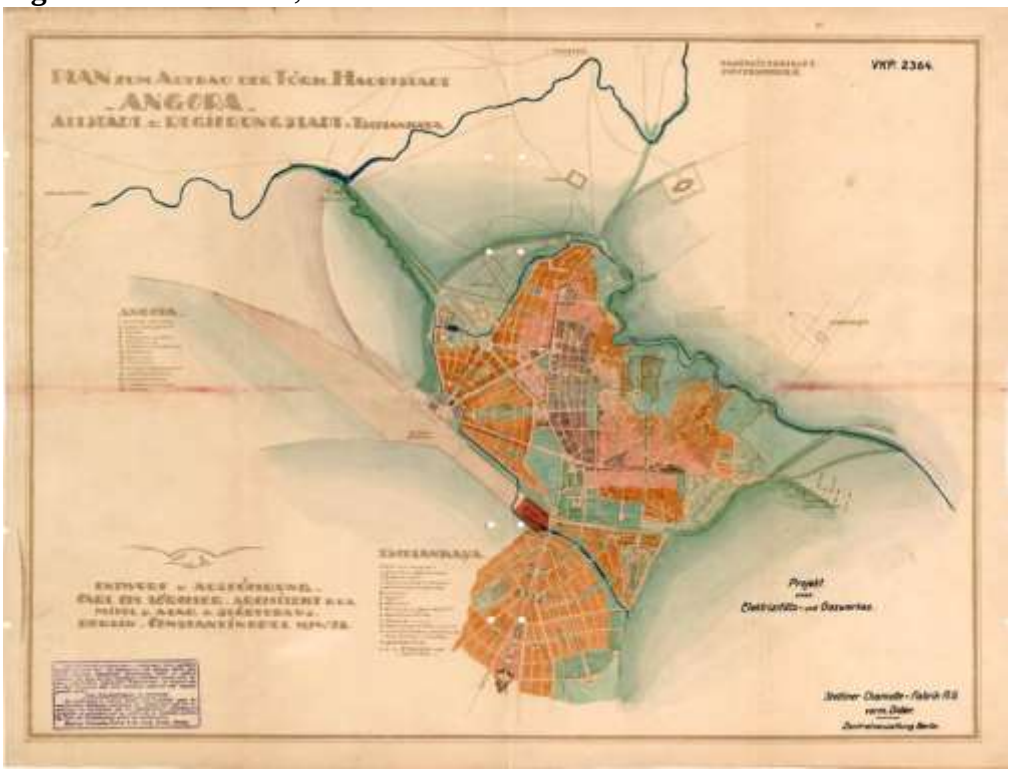

Source: National Library of Turkey, Periodicals Archive.

Basically, the Lörcher plan (Figure 2) divides the city into two main regions as the Old and New City which were organized according to the specific functional zones in the urban structure. In "Türkiye için Modern ve Planlı Bir Başkent Kurmak: Ankara 1920-1950" (Making a Modern and Planned Capital City for Turkey: Ankara 1920-1950), Cengizkan defines Old City of Lörcher as the accommodational areas for the fast growing population of Ankara, while the New City is privatized for the public and governmental needs of the capital (Cengizkan, 2018). In this respect, Çankaya neighborhood was firstly designed where the governmental buildings of the Republic are located around the public parks and squares accessed through wide boulevards (Cengizkan, 2018). In his another chapter in *Clemens Holzmiester: An Architet at the Turn of the Era* (2010), Cengizkan defines Çankaya region in detail with a special emphasis on the Ministries Quarter which was proposed in Lörcher's plan "with a wage-shaped site allotment" housing the ministry buildings, the Grand National Assembly Campus and a public park in the zone (Cengizkan, 2010).

In 1927, the proposed zones and the city planning decisions remained incapable for the needs and the three of well-known city planners of the era were invited to Ankara for a more developed city plan proper to the capital of the Turkish Republic. At this point, in *Architecture, Power, and National Identity* (1992), urban designer and planner Lawrence Vale describes Ankara as "the reconfiguration of the distribution of political, cultural and economic power in the

new state" and thus, the capital needs a more stable and organized urban layout to be an innovative and modern representation of the Republic (Vale, 2008). Amongst the plans of Jansen, Jausseley and Brix, Jansen's proposal was approved with his Garden City concept consisted of a central green area with surrounding neighborhoods as educational, governmental, accommodational and working zones (Vale, 2008).

**Figure 2.** *Lörcher Plan, 1924*



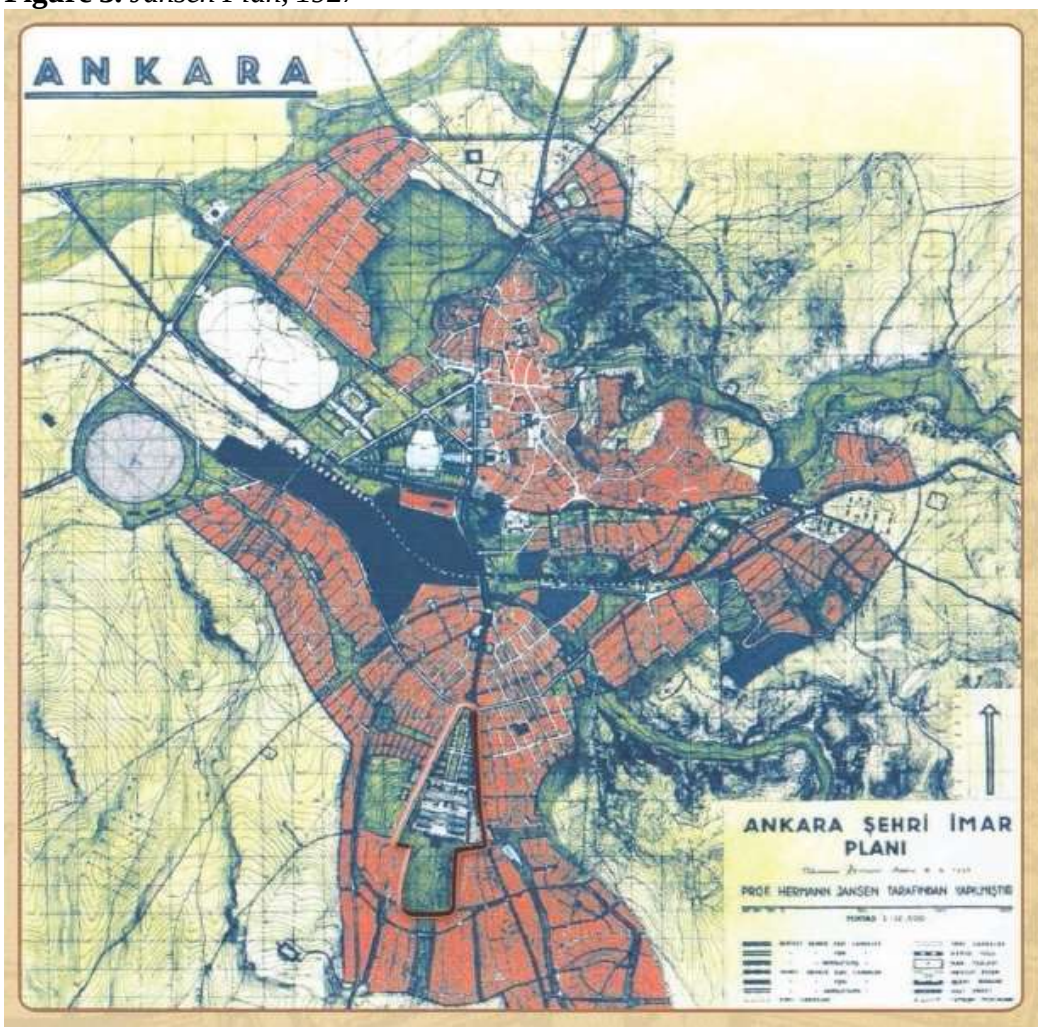

Source: http://www.goethe.de

Basically, the second city plan proposals were supposed to follow basic design principles of Lörcher's, regarding the zoning strategy with the preservation and development of the Ministries Quarter in Çankaya (Cengizkan, 2010). Importantly, as one of the striking representations of the Turkish Republic in the urban context, the main axis of the new city plan was called as the Atatürk Boulevard, who was the founder of the new country. As stated in the Presidency Senate publication of *TBMM Kampüsünün Dünü-Bugünü-Yarını* (1976), the Ministries Quarter formerly called as the *Cumhuriyet Anıtı* (the Monument of Republic) by Mustafa Kemal Atatürk to symbolically represent the new Turkey with its Republican state buildings and the contemporary assembly building at the heart of the city (*TBMM Kampüsünün Dünü-Bugünü-Yarını*, 1976).

Accordingly, the future development of Ankara was determined toward south and the zones were re-organized with the new neighborhood proposals regarding their functions as education, accommodation or working areas (Cengizkan, 2018). As the administrational zone, the former proposal of Lörcher's triangular governmental area was preserved and Jansen collaborated with Holzmeister for

construction and location of the state buildings (Cengizkan, 2010). Chronologically developed with the constructions of the ministries of National Defense, Interiors, Public Works, Economics and Agriculture, the administrational zone was organized towards the north (Figure 3), where the Grand National Assembly was located on the highest point of the area (Cengizkan, 2010).

**Figure 3.** *Jansen Plan, 1927*




Source: Yarım Asırlık Meclis Binası: 51. Yıl, 10.

Importantly in the new plan, the governmental zone needed to have a public area where the administratives and citizens could "meet" proper to the ideological basis of the democratic Republic. In this way, as Demirkol stated in her dissertation, the Güven Park and Güven Anıtı (Security Monument and the Security Monument) were located on the southern area of the zone to link the city physically and visually to the Grand National Assembly on the north through the Atatürk Boulevard as the main axis (Demirkol, 2009). Thus, the reliability and stability of the state is publicly declared at the beginning of its fundamental administrative axis which continues with the ministry buildings of the Republic (Demirkol, 2009).

On the one hand, when the construction of the GNAT was completed in 1961, the building was ready for the administrative meetings and for functioning as a parliament building with its completed convention halls, offices, grand rooms and proper technical details such as heating-cooling or ventilation. However, the symbolic additions to represent democratic Turkish nation and its long-lasted history have to be physically declared in the GNAT. Thus, under the light of Holzmeister's project, the GNAT have various symbolic details in the building scale from the entrance to the lightenings and material decisions in structure. In this way, the urban scale symbolization of the campus was completed with the interior details in the GNAT proper to the new democratic regime of the long-lived Anatolia lands.

## Symbols of a Nation: Iconographic Details in the Grand National Assembly of Turkey

Clearly, the GNAT leaves an iconographic mark in the urban context by locating at the highest point of the city and by surrounding new Republican state buildings and public parks in its immediate vicinity. From its design and construction phases to the official use as parliament building of the Turkish Republic in 1961, the GNAT imprinted on the memories as an achitectural representation of the new Turkish national identity by becoming a meeting point for Turkish people with their administrators through the physical and ideological symbols of the Republic.

When the new understanding of Turkey in the 20$^{th}$ century was necessitated a new manner in political behavior of the state, naturally, the capital city is needed a new grandeur architectural representation of the Republic in the urban context to propagate and declare the durable and stable national character of the Turkish state. From this perspective, in her dissertation, Demirkol states that the GNAT campus was designed regarding certain design principles to increase the "readability and orientation of the crowds" in special meetings of the state proper to the political mind of a democratic regime (Demirkol, 2009). Thus, the space organization of the GNAT was designed around green areas, squares, courtyards, forecourts and wide meeting halls which would properly function as meeting areas for the upper statesmen, parliament members and public (Demirkol, 2009).

However, the wide courtyards of the assemby complex received public events only in certain times such as the sod-tuning ceremony in 1939 or the opening ceremony of the Atatürk Monument in 1981. In large part of the gatherings were realized by the political figures of the time and in this way, the GNAT courtyards were used actively not by public but by the statesmen, especially in inauguration ceremonies of political periods.

In this way, it is aimed to construct unity and solidarity of the Turkish nation around the shared values of people and their collective activities in special national connotations. The celebrations of national bairams and opening ceremonies of the government annually become significant unifying occasions in the Republic, which strengthens and consolidates the national identification and sense of

belonging in masses through architecture. By placing architectural artefacts at the core of the collective occasions in societies as stages for the construction of national identity, this paper includes memory discussion by handling the GNAT as a significant memory space for the Turkish Republic. In this way, the iconographic remark of the GNAT in the collective memories of Turkish people is tried to understand by handling the building as an architectural artefact housing various symbolic details referring to the long-lived history of the Turkish states and its firm national shared values.

From this perspective, in *Memory and Material Culture*, Jones handles architecture as concretization of collective memory by evaluating them by being storages of "symbols" and "units of information" (Jones, 2007). Accordingly, not only artefacts but also all kind of materials from history onwards such as stone tablets to the photographs and computerized systems are accepted as memory storages (Jones, 2007). Focusing on the material culture and their relation with society, Jones places memorialization and recollection ways at the heart of his discussion by asking "how things help societies remember?" (Jones, 2007). Thus, all the materials as memory storages have implicit meanings immanently which become invaluable witnesses of history (Jones, 2007). Importantly, Jones emphasizes that the material culture of a society can not provide remembering by itself but can open the roads by preparing collective occasions to recollection through collectively shared experiences (Jones, 2007). In a parallel vein, the GNAT have various symbolic details in the inner and outer spaces of the assembly complex, which become active participators of the collective national ocassions and stages for the construction of a national imagery integral to the political core of the Republic.

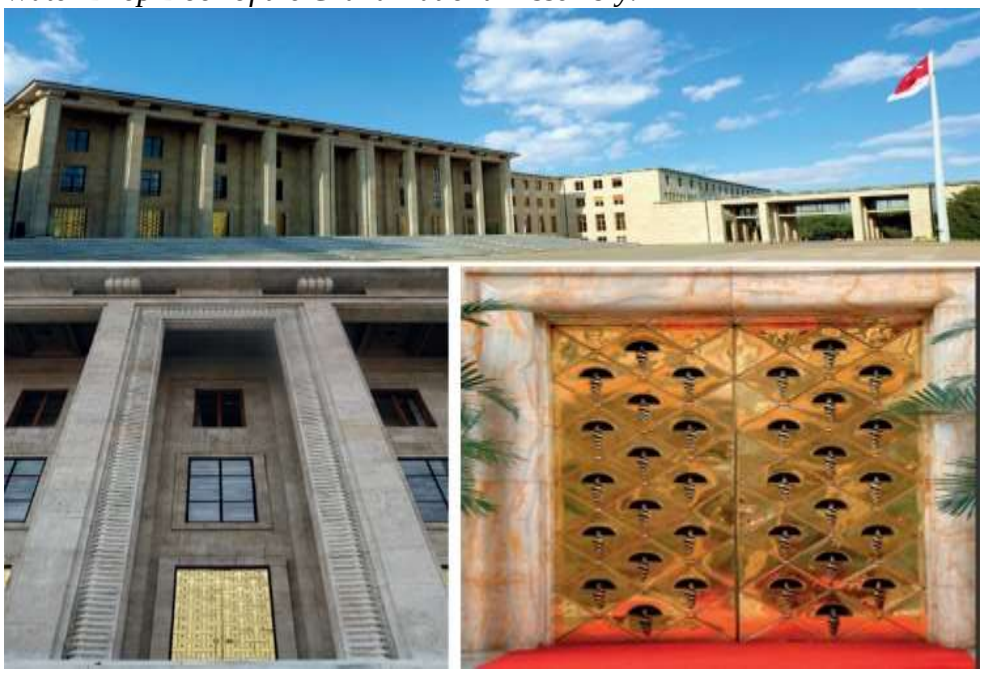
**Figure 4.** *Aerial Perspective of the GNAT Campus from the Sketches of Clemens Holzmeister*

Source: Yarım Asırlık Meclis Binası: 51. Yıl, 17.

Within this framework, the symbolic references in the GNAT can be divided into two main periods as dating back to the beginning of the 1960s and to the last years of the 1970s. Accordingly, the first phase overlaps with the opening years of the GNAT, which were produced according to the Holzmeister's original project and structural details (Figure 4). As stated in the competition text, the GNAT have to become an iconographic representation of the stable and durable existence of the Turkish Republic which draws its strength from the centuries old Turkish states in history.

Beginning from the outer space of the GNAT housing the opening ceremonies of the state and national bairam celebrations, the Turkish flag in the central point of the grand courtyard symbolizes the stability, sovereignty and invincibility of the Republic (Figure 5). Thus, this flag have never hauled down in any circumstances which struggles the country deeply (*Yarım Asırlık Meclis Binası: 51. Yıl* , 2012). Then, the main entrance gate of the GNAT is realized from the Şeref Kapısı (The Honorary Gate), which have also symbolic details in its ornament. Accordingly, the wattling pattern of the door symbolizes the indivisible integrity of the Turkish Republic through the inseparable knitting. By carrying the star and the crescent as the symbols of the Turkish Republic, the Honorary Gate can only be used by the president of the Republic and the chairperson of the parliament (*Yarım Asırlık Meclis Binası: 51. Yıl* , 2012). Additionally, the gates of the president and the chairperson differentiates in passing through the general convention hall of the GNAT. Here, the Damlalı / Salkım Kapı (The Drop / Bunch Door) is ornamented with sixteen drop figures to symbolize sixteen Turkish states in the history.

**Figure 5.** *The Turkish Flag (uppermost), Honorary Gate (lower-left) and the Water Drop Door of the Grand National Assembly.*



Source: Buildings of the Grand National Assembly of Turkey, 20, 25, 27.

As a continuation of the symbolic representations of the long-lived existence of the Turkish states, sixteen crystal chandeliers (Figure 6) illuminate the general convention hall (*Yarım Asırlık Meclis Binası: 51. Yıl* , 2012). In addition to the object-scale and ornamental details in the GNAT, the material selections are made of Afyon marbles to declare and propagate the local wealth of the country in construction materials. Importantly, as another significant symbols, the figures of anther and leo are higly used in the campus to symbolize agricultural activity of Turkey and the power symbol used from the times of the Hittites in Anatolia (*Yarım Asırlık Meclis Binası: 51. Yıl* , 2012).

**Figure 6.** *The Chandeliers of the General Hall of the GNAT, Symbolically Representing the Sixteen Turkish States*

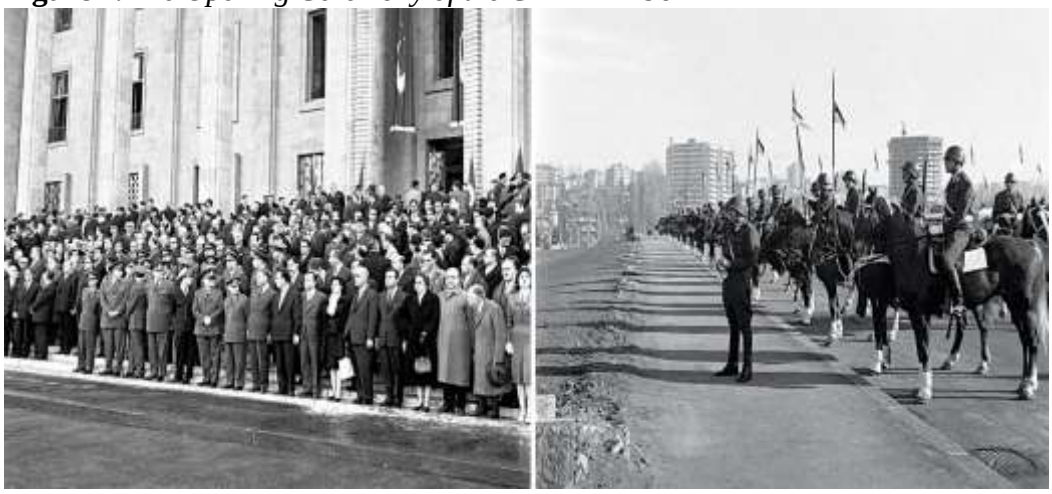
Source: Yarım Asırlık Meclis Binası: 51. Yıl, 74,76.

On the one hand, the symbolic interior details representing the long history of the Turkish state date back to the Holzmeister's original project for the GNAT, the second phase of the representations of the Turkish Republic corresponds to the last years of the 1970s when, the Committee of Monuments and Buildings (*Anıtlar ve Yapılar Hazırlık Komitesi*) held a meeting for receiving opinions to construct monuments inner and outer spaces of the assembly symbolizing the principles of Atatürk and the Turkish national existence. In his opening speech for this meeting, the President of the Republic Senate Tekin Arıburun declared that "what is a Turkish state? How long has it been on these lands? How it has gained its democratic character? These questions are frequently discussed in the assembly, but all the spoken words fly away. There are not any trace remains from these words... Here, you are supposed to concrete these discussions physically in the assembly... The story of the Turkish nation have to be seen, read and felt in the building..." (*TBMM Anıtlar Dizisi – Önfikir Araştırması I. Toplantı, Bildiriler ve Tutanaklar*, 1976). In these words, Arıburun clearly expresses the iconographic role of the GNAT for the Turkish nation by placing the building as a monumental representation of the Republic. By handling newly built statues and monuments in the GNAT campus as meaningful entities, Arıburun ideologically links the existence of the assembly with the existence of the Republic.

Moreover, Ziya Payzın, who was the chief architect of the assembly in the construction process, declares "...the Committee of Monuments and Buildings decided that the north-south axis of the assembly will be furnished with statues representing the development of the Turkish national history, and the east-west axis will be furnished with the statues of the history of Turkish principles. It has vital important to decide which themes and principles have to be represented in the GNAT. Thus, this meeting is organized and asked for help from the science and the nation" (*TBMM Anıtlar Dizisi – Önfikir Araştırması I. Toplantı, Bildiriler ve Tutanaklar*, 1976).

As clearly stated in the selected speeches, the GNAT was placed at the center of collective events of the Turkish nation through the physical representations of the Republic. In this way, the outdoor of the GNAT become a common stage for the nation where the ceremonies, celebrations and commemorations have regularly repeated to keep alive the memories of the Republic and the Turkish national identity (Figure 7). In a parallel vein, celebrations, ceremonies or inaugural gatherings for political periods open roads for remembering by establishing living connections between the artefacts and societies.

**Figure 7.** *The Opening Ceremony of the GNAT in 1961*



Source: Yarım Asırlık Meclis Binası: 51. Yıl, 106, 107.

By specifically discussing commemorations, Jones points out the repetitive character of collective occasions which are commonly shared by people at certain times and certain places (Jones, 2007). Accordingly, on the one hand the collective rituels by itself becomes a storage for memory, on the other hand, all the actors in this process from the architectural artefact housing the ceremony to the speeches are included in material culture and discussed as memory storages of recollection for future generations.

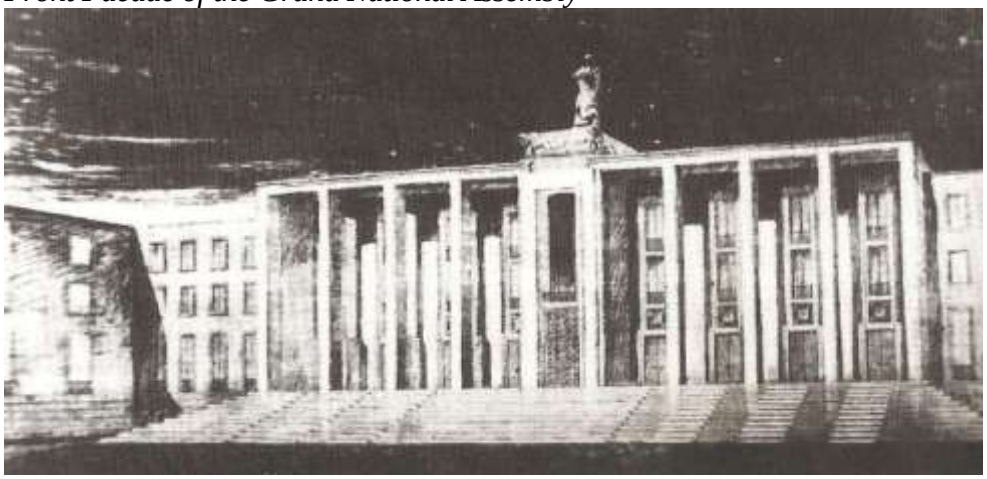
In this respect, symbolic details discussed above have equal importance in propagating and representing the Turkish national identity in the building scale through the national celebrations of the Republic. While the ceremonial occassions have been conducting in the front square of the GNAT, the flying Turkish flag, grandiosely ornamented gates of the parliament building and the Atatürk

Monument explicitly refer to the symbols of Turkishness from the history onwards. In this respect, the construction and consolidation process of the Turkish national identity is fed from the ceremonies and their symbolic agents in the building scale as the memory spaces of the Republic.

From a similar perspective, in *Time and Memory*, Crawford discusses commemorations as instruments to meet past and the present, remembering and forgetting (Crawford, 2005). By drawing attention of their collective occurrence, Crawford evaluates commemorations as intentional meetings where "the experiences and recollections of individuals weaved into a communal fabric" (Crawford, 2005). Importantly in Crawford's approach, commemoration operates as a tool which blurs individual boundaries in order to create a collective belonging in a society, especially based on a collectively shared historical past. Similar to Nora's approach, commemorations become the repetitions of "learned stories" in place of remembrance of a historical past (Crawford, 2005). In this way, they operate as "attractors" and starting points for planned future constructions which draw their strenghts from history itself (Crawford, 2005). Parallel with this understanding in practice, the meetings of the Committee of Monuments and Buildings (*Anıtlar ve Yapılar Hazırlık Komitesi*) in 1976, point out a construction process of a collective ceremonial areas and landmarks in the GNAT complex to keep alive the memories of the Republic in symbolic details and monuments.

As the first initiation of the Committee was the national competition for the Atatürk Monument of the GNAT in 1978. Previously, in Holzmeister project of the GNAT, the Atatürk Monument was proposed in detail on the roof of the front facade of the parliament building (Figure 8). However, as Demirkol states, this proposal contradicted with the ideological mindset of the Republic, which aims to connect the administrative leaders to the nation democratically and equally. Thus, "the founder of the Republic have to be represented as a civilian but not as a commander." Holzmeister's proposal was not applied and a new competition was held (Demirkol, 2009).

**Figure 8.** *Holzmeister's Proposal for the Atatürk Monument on the Roof of the Front Facade of the Grand National Assembly*



Source: Demirkol, "A Reading on Atatürk Monument in the Grand National Assembly of Turkey: From Idealized to Realized", 95.

Amongst 43 competitors, sculptor Hüseyin Gezer and architect İmran Gezer's monument proposal was selected (Figure 9). In the report of the winning proposal, Gezer states that "we are primarily supposed to design a monument with its surrounding landscape area which allows to organize public meetings and ceremonies. Thus, in order to properly represent Atatürk and to conduct collective events, we proposed an integral project with an amphi and a circular platform located in front of the parliament building... The surrounding facades are desgined to narrate Atatürk in reliefs and inscriptions... In this way, the Atatürk Epic is expressed on wide surfaces while composing a ceremonial area in the middle of the biographical narratives... At the end of the relief and inscription compositions, the Atatürk Monument locates as an ending point by symbolizing the well-known words of Atatürk, *freedom and independence is my character…"* (*Arkitekt*, 1979).

**Figure 9.** *Holzmeister's Proposal for the Atatürk Monument on the Roof of the Front Facade of the Grand National Assembly*

Source: Demirkol, The Turkish Grand National Assembly Complex: An Evaluation of the Function and Meaning of Parliamentary Spaces, 115.

In 1981, the opening of the Atatürk Monument was held with a well-attended public ceremony as it was supposed in the competition text (Figure 10 & 11). Then, the monument and its square become one of the most important ceremonial area by housing the national bariam celebrations in keeping the memories of the Republic. In addition to the concrete representation of the Republic in the GNAT via structural and architectural details, the written and visual media have actively participated to keep memories of the Republic in daily circulation through photographs and news in periodicals. In *Media and Memory*, Garde-Hansen discusses the representation of history through images, texts and narratives as tools of "media." Accordingly, Garde-Hansen handles media as "the first draft of history" which connects historical events to the contemporary lives through the instruments of representation and points out that media become a powerful tool by including all kind of visual material evidence to declare hegemony of a society

through national connotations (Garde-Hansen, 2011). Similarly, the power of media was also used by the state of the time and the sod-turning ceremony of the GNAT in 1939, the opening of the complex in 1961 and the first meeting of the new Republic in the parliament forcefully announced in newspapers to imprint the GNAT on memories as the iconographic representation of the Turkish national identity.

**Figure 10.** *The Opening Ceremony of Atatürk Monument in the Grand National Assembly of Turkey in 1981.*

Source: Demirkol, "A Reading on Atatürk Monument in the Grand National Assembly of Turkey: From Idealized to Realized", 99.

**Figure 11.** *The Newspaper Headlines on the Sud-turning and Opening Ceremonies of the GNAT*


Source: National Library of Turkey, Periodicals Archive.

## Conclusion

Clearly, the Grand National Assembly of Turkey carries special meanings and symbolic representations of the country where the Anatolian lands were transformed into a homeland for Turkish nation. Both in abstract and concrete symbols, the administrative core of the country become the durable and stable icon of the long-lived existence of the Turkish nation from the centuries old history. As a brief reminder, Nora points out that the architectural artefacts may transform into laboratories for certain social, political or ideological objectives of states. In a similar way, the Early Republican Period of Turkey have also these memory spaces for constructing and declaring the comprehensive transformation of the country towards democracy from the beginning of the last century.

As briefly discussed, the national architecture movements in the first half of the 20th century and the search for a new architectural language for the Turkish Republic are amongst significant mediators for the state to construct concrete links between the new democratic citizens and their spaces to live in. Naturally, Ankara becomes the prominent showcase of the Republic as the capital with the new city planning proposals, accommodation and working zones, and recreation areas in neighborhoods and state buildings in the Ministries Quarter.

On the one hand, these new proposals and applications in the urban structure can be classified as larger-scale representations of the Republic in planning decisions of the capital; on the other hand, each architectural construction in these proposals have various symbols and remarks of the new national architectural language of the country. Moreover, not only the Grand National Assembly but also in a large number of components in the built environment of Ankara has kept the memories of the Republic and the long-lived existence of Turkish states in history today.

Importantly, the public character of the Grand National Assembly is worthy to discuss considering the public use of the complex in special events. Although the large courtyards and gardens of the campus were planned as living spaces of the national celebrations with the participation of public, most of the time, these areas became stages for only political figures in special times, especially for the opening celebrations of the political periods. Generally, the public aspect of the complex supported by the help of the written and visual media with publishing the inner space photographs of the general meetings in party halls.

From this point of view, the Grand National Assembly of Turkey left remarks on the memories of the Turkish nation in various scales. To make it clear, the public use of the complex was underlined especially with the photographs of the interior space of the building, administrative figures, leaders and moments in political meetings and ceremonies via the printed media in daily life circulation. On the other hand, the outer spaces of the building were actively used in certain public events such as the sod-tuning ceremony of the complex in 1930s and the opening ceremony of the Atatürk Monument in 1980s.

In this way, the Grand National Assembly becomes an important part of the Turkish national identity construction period with its monumental representation and the symbolic value in the memories from the early years of the 20th century.

From its architectural competition text full of national connotations, to the construction details proper to the Second National Architectural Movement and to the monumental symbols in the inner and outer spaces of the campus, the Grand National Assembly of Turkey has been staying in use as the living witness and memory space of the Turkish Republic from its opening in 1961 until today in various scales of representation.

## References


Arkitekt. (1979) "Türkiye Büyük Millet Meclisi Atatürk Anıtı" (originally published in Turkish – "The Atatürk Monument of the Grand National Assembly").

Aslanoğlu, İ. (2010) *Erken Cumhuriyet Dönemi Mimarlığı.* (originally published in Turkish – *Early Republican Architecture: 1923-1938*). İstanbul: Bilge Kültür Sanat.

Bastea, E. ed. by. (2004) *Memory and Architecture.* Mexico: New Mexico Press.

Bozdoğan, S. (2012) *Translated by* Tuncay Birkan. *Modernizm ve Ulusun İnşası* (originally published in English – *Modernism and Nation Building: Turkish Architectural Culture in the Early Republic*, 2001). İstanbul: Metis Yayınları.

Cengizkan, A. (2010) "Holzmeister, *et al.* A Mise en Scene for Republican Power: Representations in the Ministries Quarter, Ankara." In *Clemens Holzmeister: An Architect at the Turn of the Era*. İstanbul: Boyut Yayıncılık.

Cengizkan, A. "Türkiye için Modern ve Planlı Bir Başkent Kurmak: Ankara 1920-1950." (originally published in Turkish – "Construction of a Modern and Planned Capital for Turkey: Ankara 1920-1950") Available from: http://www.goethe.de [Accessed: 9.3.2018]

Crawford, M. (2005) "Commemoration: Where Remembering and Forgetting Meet", in *Time and Memory* (ed. by Paul Harris et. al.).

Demirkol, H. G. (2009) "The Turkish Grand National Assembly Complex: An Evaluation of theFunction and Meaning of Parliamentary Spaces," Ph.D. dissertation. Ankara: Middle East Technical University.

Ergut, T. E. (1998) "Making a National Architecture: Architecture and the Nation-state in EarlyRepublican Turkey, Ph.D. dissertation. Ankara: Middle East Technical University.

Feroz, A. (1993) *The Making of Modern Turkey.* New York: Routledge Taylor & Francis Group.

Garde-Hansen, J. (2011) *Media and Memory.* Edinburgh: Edinburgh University Press.

Halbwachs, M. (1992) *On Collective Memory* (trans. and ed. by Lewis A. Coser). Chicago: University of Chicago Press.

Jones, A. (2007) *Memory and Material Culture.* Cambridge: Cambridge University Press.

Kadıoğlu, A. (1997) "Cumhuriyetin Kuruluş Yıllarında Türk Milliyetçiliğinin Çelişkisi ve SeçkinlerinTavrı." ("The Paradox in Turkish Nationalism in the Founding Years of the Republic and the Republican Elite"). In *Cumhuriyet, Demokrasi ve Kimlik Sempozyumu Kitabı,* Ankara: Bağlam.

Lowenthal, D. (2005) *Past is a Foreign Country.* Cambridge: Cambridge University Press.

Nora, P. *Hafıza Mekanları.* (2006) *Translated by* Mehmet Emin Özcan (originally published in French, *Les Lieux de Memoire,* 1984). Ankara: Dost Kitabevi Yayınları.

Sözen, M. (1996) *Cumhuriyet Dönemi Türk Mimarisi* (originally published in Turkish - *Turkish Architecture in the Republican Period*). İstanbul: Türkiye İş Bankası Yayınları.

*TBMM Anıtlar Dizisi – Önfikir Araştırması I. Toplantı, Bildiriler ve Tutanaklar* (1976) (originally published in Turkish - *GNAT Monuments Series: The First Meeting of the Opinion Survey, Reports and Proceedings*). Ankara: TBMM Matbaası.

*TBMM Kampüsünün Dünü-Bugünü-Yarını* (1976) (originally published in Turkish - *The Past-Present-Future of the GNAT Campus*). Ankara: Türkiye Büyük Millet Meclisi Matbaası.

Tümer, G. (1998) *Cumhuriyet Dönemi'nde Yabancı Mimarlar Sorunu* (originally published in Turkish – *The Foreign Architects Issue in the Republican Period*). İzmir: İzmir Mimarlar Odası Şubesi).

Vale, L. (2008) *Architecture, Power, and National Identity*. London: Routledge Taylor & Francis Group.

*Yarım Asırlık Meclis Binası: 51. Yıl* (originally published in Turkish - *Half-Century Old Assembly Building: 51st Year*). Ankara: TBMM Prestij Kitaplar, TBMM Basın, Yayın ve Halkla İlişkiler Başkanlığı Yayınları No:1, Nisan 2012.

www.tbmm.gov.tr [Accessed: 11.3.2018]

www.kultur.gov.tr [Accessed: 11.3.2018]

# Determinants and Effects of Vertical Integration on the Performance of Moroccan Manufacturing

*By Mohamed Hamdaoui[*] & Brahim Bouayad[†]*

*In this paper we study the vertical integration of the Moroccan industrial sector, its determinants and its effects on the economic performance of the sector and on the economy in general. A key aspect of our analysis is to present the link between the theories of the firm and vertical integration, and the incentives to vertical integration according to two approaches*: *monopoly theory and efficiency. Next, we also present the choice of integration measure, their determinants and their effects on economical performance. Our findings show that the Moroccan industry is characterized by the weakness and dispersion of the degree of vertical integration. They also show the existence of a correlation between the degree of vertical integration and market factors. Thus, the degree of integration of industries is explained, essentially, by the basic conditions and the structures of the industrial sector, particularly, the degree of concentration, the capital intensity, the level of the barriers to entry, the importance of economies of scale and the rate of sales growth. These factors also reflect the hypotheses of the main explanatory theories of vertical integration, particularly those of monopoly and efficiency. The latter finding reveals, however, a negative correlation between the degree of vertical integration and the profitability of industrial firms. This confirms the idea that integration is usually accompanied by significant costs (bureaucratic costs, costs resulting from changes in incentives) that offset its savings (savings in transaction costs, savings related to monopoly power).*

**Keywords**: *Vertical Integration, Theory of the Firm, Industry, Morroco*
**JEL Classification:** L6, L42, D21, D52

## Introduction

It is difficult to treat the theories of the firm (as a production process) without mentioning a certain degree of vertical integration[1]. This complexity poses many theoretical and empirical difficulties for the treatment of both approaches. The use of vertical integration is usually justified by some to increase market power of firms, and for others, by the will to increase the efficiency of firms.

Note that the question of the firm's vertical dimension relates to several disciplines. In the first place, the theory of vertical integration occupies an important place in economics and particularly the theory of the firm. This

[*]Professor, Economics Department and Laboratory for Research in, Energy Economics, Environment and Resources (GREER), Cadi Ayyad University, Morocco.
[†]Professor, Economics Department and Director, Laboratory for Research in, Energy Economics, Environment and Resources (GREER), Cadi Ayyad University, Morocco.
[1]"The transfer from one department to another of a good or a service which could be sold on a market without major adaptation" (Adelman, 1949, p. 29).

importance is justified by the need to determine the optimal vertical size of the firm. Secondly, lawyers are increasingly interested in the theory of vertical integration due to the contributions and insights it has brought to the contract theory and its fundamental contribution to antitrust laws. This interest translates, thus, the deep conviction of the researchers that the resolution of the problems of the firm goes first by the understanding of the functioning of this one and the different relations it maintains with the other economic agents. Finally, the strategy of vertical integration is a controversial topic for strategic management and business leaders, due notably to mixed results of vertical mergers operations that have marked the last decades. Nevertheless, it still constitutes the frame of reference in all decisions relating to the choice between "make or buy" and continues to occupy an important place in the vertical development strategies of firms.

Generally, the vertical integration theory studies the different incentives for firms to produce the goods and services they need for their production processes instead of using the market, and to examine the effects of this choice on firm performance and vertical structures. Thus, theorists were led to define precisely the different dimensions of vertical integration and to mark the boundaries it has with other forms of vertical relations. They were thus faced with many methodological, theoretical and practical difficulties.

The first problem encountered by economists was to give a convincing definition of the notions of "firm" and "vertical integration". Indeed, economic theory proposes multiple approaches of the firm. Some of them emphasize the technological dimension by considering the firm as a production function, while others place more emphasis on its contractual forms.

The second problem concerns the delimitation of the various forms of vertical relations. Usually, companies often choose between making or buying a product or a service. But, in practice, these two choices are only the extreme solutions of a continuum of possible vertical relations. These relationships include, indeed, all forms of quasi-integration, partnerships and long term contracts. Faced with this multitude of alternatives, it is often difficult to draw a hermetic line between integration in the strict sense and all other forms of non-integration.

The third problem is a direct consequence of the previous ones and is particularly relevant to the question of measuring vertical integration. Indeed, the choice of a measure must faithfully represent the definition of vertical integration and must clearly differentiate it from other forms of relationship. So, the measurement index should be able to quantify internal transfers to the company, which seems to be difficult for both methodological and practical reasons.

The last problem relates, in turn, to the specification of the main determinants of vertical integration and the assessment of its effects on economical performance. In this context, the economic theory creates a great debate, opposing the opponents of the monopoly theory on one side, and those of the efficiency on the other. The opposition of the reasoning of the two

theories thus reflects the attitudes of their followers towards vertical integration and its effects on social welfare.

In an effort to give answers to these problems, we will present in the first section the main approaches of the firm and vertical integration. In the second section, we will highlight the link between incentives for vertical integration and efficiency issues. The characteristics of the Moroccan manufacturing industries which constitute the scope of our study will be sketched in the third section. Section four will present the choice of measurement and the numerical results obtained. The last section will conclude.

## Firm Approaches and Vertical Integration

### *Theories of the Firm*

The concepts of firm and vertical integration pose many problems in their definition. These problems relate, firstly, to the difficulty of apprehending these concepts, and secondly, to the multiplicity of theoretical approaches in the field.

The theory of the firm is characterized by a great diversity of approaches that apprehend the firm under different angles of vision. The purpose of the paper will, however, focus on those that define the firm by reference to its vertical dimension. In this context, we distinguish the neoclassical approach which emphasizes the technological dimension and considers the firm as a production function, and the new contractual theories that focus more on incentive issues and on the different forms of contracting.

As an economic agent, the firm ensures the production of goods and services with the concern for a better allocation of economic resources. It must first solve a technical problem by choosing the optimal combination of factors of production that maximizes its output. Then, it must choose the level of output that maximizes the profits. In other words, the necessary condition for profit maximization is, generally, expressed by the equalization of the marginal cost of production and the marginal revenue (price).

The marginalist view of the firm is open to criticism in more than one aspects, especially for its optimizing behavior and its uniqueness of purpose. In fact, members of an organization often use rough rules instead of complex calculations, even more if we take into account the uncertainty of the forecasts concerning contingent situations. In this case, the firm no longer controls all the variables on which the achievement of its objective depends (Knight, 1933). Similarly, organizations can have many objectives that may conflict with profit maximization, including survival, security, sales growth, leisure, or the power of leaders (Monsen & Downs, 1965; Baumol, 1959; Cyert & March, 1963). The critics of neoclassical theory insist, therefore, on the lack of realism of the objectives of this approach and its inability to apprehend the firm in terms of its functioning, its behavior and its objective. It must be emphasized, however, that the firm's model in the marginalist theory was not intended to

explain and predict the behavior of firms in the real world, but rather to explain and predict changes in observed prices. We must not, therefore, blame this theory for an objective for which it was not conceived (Machlup, 1967).

The limitations of the neoclassical approach have, thus, contributed to the appearance of many theories that attempt to provide a better description of the functioning of the firm in the real world by insisting on the problems of incentives and the different forms of contracting. This is notably the case of the principal-agent theory, which defines the firm through the agency relationships linking the different members of an organization, and which is essentially based on the idea of separation between ownership and control, and divergence or conflict of interests between shareholders and managers.

This approach consequently makes it possible to overcome certain shortcomings of the neoclassical vision, by adopting an approach much closer to the reality of modern firms and the relative demystification of the black box, through the description of a significant aspect of the functioning of the firm. However, the principal-agent approach remains unable to provide explanations for certain points that seem essential to any objective theory of the firm, e.g., the approach does not describe the decision-making mechanisms and the role of authority within a hierarchy. Thus, this theory is not able to describe the relationship of the firm with other economic agents, as well as its relationship with the market, and the restriction of these different relationships to agency problems would be a too excessive reduction of reality.

Contrary to the agency's approach, the transaction costs theory is particularly important because of the originality of its method and the relevance of the questions it tries to answer. Indeed, the theory adopts a contractual approach characterized by:

1. Adopting a microanalytical approach that retains the transaction as a basic unit of analysis.

2. Retaining more realistic behavioral assumptions that are better adapted to the functioning of the economic system.

3. Adopting an institutional analysis that considers the firm and the market as two economic institutions with the same role in economic activity.

4. Considering the firm as a governance structure.

The transaction costs theory, thus, considers the firm and the market as two alternative modes whose objective is the coordination of production. Outside the firm, price movements guide production, which is coordinated through a series of market exchanges. On the other hand, these market transactions are eliminated within the firm where the coordinating entrepreneur substitutes the complicated structure of exchanges. The choice is made, therefore, between the coordination by the management and the coordination by the prices. As a result, the form of organization that will be required for

each transaction will be the one that results in the lowest transaction costs. This principle acts, according to Coase (1937), by describing the growth and the optimal size of a firm. However, the transaction costs theory has prompted many critics that relate mainly to its low operational nature. In this context, Clarke (1985) considers that the transactional theory of the firm was essentially descriptive and it lacks operational content as it can not provide empirically verifiable hypotheses. Similarly, Alchian and Demsetz (1972) criticize the theory on two aspects. The first concerns the difficulty of formalizing its assertions, in that it is often impossible to specify the nature of the transaction costs. The second concerns the weakness of the dichotomy of the role of authority in the firm and that of the price mechanism on the market.

The set of criticisms addressed to the transaction costs theory has given rise to an important literature referring to the notion of incomplete contract. This emphasizes the fact that the firm and the contract are different modes of governance and considers the company as a particular way of specifying the contingencies not provided for by a contract. This approach is based on the idea that contracts are necessarily incomplete because some events are unpredictable, or because there are too many to specify all in writing. In a world characterized by incomplete contracts and high transaction costs, the firm is defined by referring to the residual control rights conferred by the ownership of the physical assets used in its production process. The property rights approach, therefore, bases its reasoning on the idea that possession of an asset provides the right to use it in all situations not specified by an incomplete contract. However, these rights only concern physical assets, since they can be sold and transferred in contrast to human assets. Thus, the reasoning of the property rights theory does not make an explicit distinction between ownership and control. However, this conception can be applied to small firms where control is concentrated in the hands of the owners, but cannot be valid in capital companies which are characterized by an increasingly marked divorce between ownership and control. This deficiency, therefore, constitutes a restriction of the approach to individual companies only.

### *The Concept of Vertical Integration*

The concept of vertical integration has taken several meanings in the literature with a common idea that the company sometimes chooses to internalize certain operations instead of resorting to an external stakeholder. This integration occurs if the structure includes two stages of production so that all of the upstream stage production is used as input to the downstream stage and all of the downstream stage requirements are provided by the upstream stage (Perry, 1989).

This definition remains restrictive because it stipulates that the volume of production at the upstream stage corresponds exactly to the input requirements of the downstream stage. In other words, the upstream unit and the downstream unit are respectively exclusive supplier and customer.

As a result, the vertical integration is characterized by substituting the internal exchange to trade or contract exchange, so that the goods in question do not transit through the market and therefore do not refer to the market price. Nevertheless, this substitution alone is not enough to define vertical integration, but it requires that one must have full flexibility in making production and distribution decisions in all the stages it controls (Coase, 1937). To be able to ensure this coordination, the entrepreneur has a specific instrument to the hierarchy, namely the authority. The latter is precisely what defines a firm, since within it, the transactions result from the instructions and orders of the leader. Vertical integration allows the firm to move from the purchase of inputs to that of their production (Williamson, 1985).

Using a different logic, Grossman and Hart (1986) define vertical integration as the ownership and absolute control of physical assets. Riordan (1990), meanwhile, defines vertical integration as "the organization of two successive stages of production by a single firm". He regards the firm as a legal entity that holds assets and enters into commercial and financial contracts. Therefore, the organization of a production process by a firm requires the appropriation or purchase of inputs required for production. Riordan's definition distinguishes the organization of a process and its control, which is essentially a managerial function. The authority of the manager remains, however, defined by a contract with the firm, which remains responsible for the contractual obligations taken by the manager on its behalf.

## Incentives for Vertical Integration and Efficiency Issues

The theory of vertical integration offers, of course, a large number of determinants that we can group under two main currents: the theory of monopoly is placed in the extension of the neoclassical tradition and that of efficiency, represented, essentially, by the contractual theories of the firm.

### *Approach to Monopoly Theory*

In this design, vertical integration is incompatible with perfect competition[1], because the different forms of imperfection create numerous incentives for the integration of enterprises. Thus, a firm can integrate vertically to reinforce its monopoly power and limit effective and potential competition[2]. Similarly, vertical integration may be justified by the desire to eliminate the various distortions created by monopolistic structures. Finally, problems of uncertainty, agency problems and asymmetric information can be determinants of integration, even in competitive structures.

[1]The perfection of the markets makes it possible to eliminate most of the incentives for integration.

[2]This is particularly the case when integration is equated with strategic behavior by introducing new barriers to entry, foreclosure of the market or price squeeze.

It should be noted that, in many cases, vertical integration is not justified by the desire to improve the economic efficiency in a vertical structure, but rather by the weakening, even the elimination, of actual and potential competitors of integrated firms[1]. Similarly, integration may be motivated by the desire to weaken or crowd out the actual competitors of a firm[2]. Finally, vertical integration may result in the outright foreclosure of actual competitors through the refusal of supply by the integrated firms[3].

In these cases, it seems clear that vertical integration is not motivated by the desire to improve the economic efficiency of the vertical structure, but rather by the increase of the monopoly power of the integrated firm at the expense of its actual and/or potential rivals. Similarly, vertical integration solves the negotiation problems posed by a bilateral monopoly structure characterized by a divergence of the individual interests of the upstream monopoly and the downstream monopsony[4]. However, the solution of integration allows the realization of joint profit maximization and may solve the problems of restriction of production and those related to the negotiations on the intermediate product price (Scherer, 1990).

These results can be generalized, but to a lesser extent, in cases where at least one of the vertical stages is competitive. This is the case where integration is used by a monopoly for price discrimination between its different customers. In fact, the problems of arbitrage, imperfect information on customer preferences or the legal prohibition of discrimination often encourage firms to use integration to discriminate between these customers. In this context, integration can be a perfect substitute for the company to avoid arbitrage and realize the benefits of discrimination (Wallace, 1937; Stigler, 1951; Perry, 1978).

Vertical integration can solve the problems caused by rationing prices when the market is characterized by a significant difference between the actual price and the equilibrium price (Stigler, 1951; Green, 1974). The same applies when the market is characterized by price fluctuations resulting from possible exogenous changes in supply and/or intermediate demand. Indeed, these fluctuations often affect the upstream and downstream stages in the opposite direction: an increase in the price of the intermediate good positively affects the firm located upstream and negatively the one located at the downstream stage. In such situations, vertical integration can be used to mitigate the

[1]Many authors defend the idea that vertical integration can be used by some companies to erect new barriers to entry through increased capital costs of potential entrants (Bain, 1955; Stigler, 1968).

[2]This is particularly the case where it is used to facilitate the practice of price squeeze by reducing the profit margins of customers or suppliers of the integrated producer below the allowable threshold.

[3]Vertical foreclosure is based on the leverage hypothesis that the integrated firm can use the market power of non integrated upstream firms to reinforce its own market power in the downstream stage (Krattenmaker & Salop, 1986; Salinger, 1988).

[4]In this context, the maximization of the individual profits of the two firms entails a restriction of the exchanged quantity of the intermediate good and a consequent increase in the price of the final good.

negative effects of fluctuations, through the synchronization of the production in both stages and the abstention of the integrated firm from participating in the intermediate good market (Perry, 1982). It can also be used to take advantage of the positive effects that can result from it through the diversification of the incomes of the integrated firm enabled by the possibility of speculation in the intermediate market (Perry, 1984) In addition to the problems caused by the uncertainties of supply and/or demand, vertical integration makes it possible to solve the difficulties posed by the asymmetrical distribution of information; in particular, the problems of agency and the use of the information for strategic purposes. Indeed, customers are often encouraged to conceal information relating to the demand and the selling price of their product. This is also the case for suppliers who conceal the cost of production and the level of supply. In such situations, the principal has a strong incentive to vertical integration to solve the agency problem. But at this level, the question is whether vertical integration allows the elimination of the agency relationship, or if it only internalizes it. In this context, the work of Arrow (1975) shows that integration is generally capable of solving the agency problem and changing the structure of information by preventing its use for strategic purposes. However, Crocker (1983) shows that integration does not eliminate the agency relationship but it requires knowledge of private information by internal audit. Nevertheless, the conclusions of both authors clearly confirm the proposals of Williamson (1985) and Riordan (1990) for the effects of vertical integration on the structure of information.

*The Efficiency Approach*

Contrary to the arguments of the theory of monopoly, the proponents of efficiency justify vertical integration by the will to choose the most effective organization form[1]. Thus, the internalization of an activity is much more than an arbitrage between the costs and the savings occasioned by the different possible forms of organization. In the framework of the transaction costs theory, vertical integration causes, both costs and savings to be taken into account in each internalization decision[2].

It also allows the achieving of significant savings related essentially to the transaction costs, that are more important in markets with small number and where the prevalence of uncertainty/complexity limits the rationality of agents and increases their opportunistic propensity. These environmental and human

[1]This arbitrage generally allows the choice of the most economically efficient solution.

[2]Indeed, the internalization of an activity implies, on one hand, the increase of the size of a firm and the consequent increase of bureaucratic costs, and on the other hand, the change of the incentives of the members of the firm because of the transition from the market mode to that of the internal organization. The first effect is explained by the hypothesis of decreasing returns on management function defended by Knight (1933) and Coase (1937), and the loss of control phenomenon advanced by Williamson (1967). The second effect, on the other hand, refers to the difficulty of making a selective intervention and of reproducing the strong market incentives when moving from the market mode to that of the internal organization (Williamson, 1985) .

factors are much more important in relationships with frequent exchange since they further complicate the exchange process. In such context, vertical integration or internal organization is an effective solution for coordinating the exchange activity through the governance and coordination instruments that differentiate it from the organization by the market. More specifically, transaction cost theory advocates vertical integration in all exchange relationships requiring significant investments in specific assets[1]. The reason why the specific investment involves a bilateral dependence is due to the fact that the cease of the exchange relationship would be detrimental to the different parties. In this context, anonymous contracting is supplanted by a contractualization where the identity of the parties is decisive. As a result, contractors find themselves locked into a relationship with bilateral dependence, often giving rise to opportunistic tensions and propensities.

Linked in a bilateral monopoly relationship, the contracting parties find themselves in a strategic bargaining position for an incremental gain resulting from any adaptation of one of the parties. Although both have interest in making long-term adjustments permitting the maximization of joint profits, each one will seek to capture the maximum gains at the expense of the other. These opportunistic propensities, thus, result in costly haggling that can dissipate all gains from the relationship. This bargaining deals, essentially, with the additional surplus allowed by the specific investment and it is often characterized by the attempt of a "quasi-rents expropriation" by the contractor who has not invested in the relation (Klein, Crawford & Alchian, 1978), or a "hold up" (Goldberg, 1976; Allain, Chambolle & Rey, 2014). Thus, the situation of bilateral monopoly implies two fundamental effects on contracting, namely, the difficulty of *ex post* sharing of gains resulted from investing in specific assets and the *ex ante* incentive for the various parties to underinvest in the exchange relationship.

As a result, the contractual form governing the bilateral monopoly structures must maintain the optimal incentive for specific investment by solving the problem of *ex post* bargaining between the different parties. In this context, economic theory presents two different approaches:

> The first considers that the cause of the problem is purely transactional, because of the limited rationality represented by the inability of the parties to draft full contingency contracts, and the opportunism of the party who does not invest in the exchange relationship. Analysis in works representing this current (Williamson, 1985; Klein, Crawford & Alchian, 1978) refers to the institutional comparison between vertical integration and the market as solutions to the problem, and emphasizes the faculty of integration to mitigate opportunistic behavior and to maintain investment incentives at the optimal level.
>
> The second refers to the incomplete contracts literature affirming that between the two extremes, there is a series of incomplete contracts likely

[1]Indeed, the specificity of assets implies a "fundamental transformation" of the exchange relationship, in that it locks the contracting parties into a situation of bilateral monopoly.

to give the same results of vertical integration and avoiding its disadvantages (Grossman & Hart, 1986; Holmström & Tirole, 1989; Hart & Moore, 1990)[1].

## Vertical Integration in the Moroccan Manufacturing Industry: Empirical Test

In order to check the validity of the assumptions made by the different theories of vertical integration, we attempt to do a specific empirical study to the Moroccan industrial sector, so as to measure the degree of integration of the various industrial sectors and to identify the factors and effects of integration on the performance of the Moroccan industry.

Since its independence, Morocco has adopted a development strategy aimed at laying the foundations for an independent and dynamic national economy. This strategy ended, however, with an economic and social crisis, whose most significant indicators were the internal and external financial imbalances and the worsening social disparities that marked the beginning of the 1980s. At the industrial level, the failure of the development strategy has resulted in the accentuation of the dualities of the public and private, on one hand, and the formal and informal sectors on the other. In this context, the Moroccan authorities began, as early as the second half of the 1980s, a series of reforms including the structural adjustment program aiming at cleaning up the national economy and improve the competitiveness of the different sectors of production. These reforms have affected, in the first place, the fundamental financial balances and the questioning of the role of the State in the economic activity, at the institutional, legal, fiscal and financial level. In the industrial field, the reforms aimed at improving the competitiveness of the sector through the withdrawal of the State from the production activity, the deregulation of the markets and the liberalization of domestic prices. At the external level, reforms have focused on the progressive liberalization of foreign trade through the substitution of tariff protection for the quota system and the promotion of exports.

Despite these efforts, the output of the Moroccan manufacturing industry remains quite low. Between 1980 and 1989, the average annual growth rate of industrial production was barely above 4% and the manufacturing sector's share of GDP hardly exceeded 18% (World Bank, 1993). This weakness was further accentuated during the 1990s as a result of the relative liberalization of manufacturing imports. Thus, the share of manufacturing output in GDP was barely 16% in 1997 (Ministère du Commerce, de l'Industrie et de l'Artisanat, 1998, p.11). This observation clearly reflects the weakness of the industrial tissue and the anomalies related to industrial structure and performance.

[1]For Grossman and Hart (1986) the two parts of the exchange relationship may rely on a third party who can make the effective decisions. For Holmström and Tirole (1989) the comparison of the different forms of organization depends essentially on the nature of the specific assets.

In terms of industrial structure, the Moroccan manufacturing sector is marked by a relatively high degree of industrial concentration and a low mobility of capital. In fact, despite the positive evolution of the level of concentration, industrial production remains assured by a minority of large companies in most industrial branches. The large weight of big companies is also reflected in the low mobility of industrial capital, due to the high level of barriers to entry particularly in the "drinks and tobacco", "chemicals and parachemicals" sectors. And "the products of the basic metal industry" characterized by a relatively high rate of public participation of capital and a high protection against import competition. These characteristics allow, therefore, to make a useful assessment of the dynamics of the manufacturing industry in Morocco. So, the main idea that emerges is that the process of corporate concentration is the dominant feature of growth. The new businesses are relatively numerous, but the emergence of new entrepreneurs is not likely to bring competition to the existing businesses. The observable active competition is mainly the result of the companies established and even more of the effect of the liberalization of foreign trade. Likewise, the weakness of inter-branch capital mobility arises from the fact that entrants are generally small and remain handicapped by their economies of scale.

The structural characteristics of the Moroccan manufacturing industry have a direct influence on the level and dispersion of its performance. Indeed, the study carried out by Belghazi (1997) shows the low profitability and the wide dispersion of margin rates and price-cost ratios in most industrial sectors. This finding can be explained by the relative importance of small firms in the industrial tissue. In fact, the proportion of firms producing at a loss appears to be negatively correlated with firm size.

In parallel, the Moroccan industrial tissue is characterized by a dualism that opposes, on one hand, high productivity companies, and on the other hand, the low productivity ones. This allows us to identify two different behaviors: that of companies relying on the low cost of labor and preferring intensive processes in unskilled labor and inefficient management of the labor force, and that of companies choosing technical solutions and grant incentive salaries in order to maximize the productive potential of the human and material resources mobilized.

Thus, companies of the first type spend much more human energy and mobilize little supervision and qualified work. Refusing to substitute a work force devalued by machines, they are content with the manufacture of a product of poor quality. However, they can be competitively sustainable in the local market because of low wages and tax evasion. On the other hand, they are gradually losing their strengths on the international market because their competitors are modernizing more and more and are introducing new productive innovations. Companies of the second type are sometimes at the forefront of international techniques and prefer to equip themselves with mechanized or automated equipment to avoid the management problems posed by a labor force that is not suited to the tasks of a modern industry.

Overall, the flexibility of the productive apparatus seems limited. The analysis of the dispersion of profitability reveals that the dominant trend is that of the disparity of profit rates. Thus, despite the noticeable decrease in the level of disparities during the period of structural adjustment, the flexibility of the structures remains insufficient: the potential investments still face significant barriers to entry, the size of the internal market, the difficulty to conquer new export niches and burdensome initial investment.

## Measuring the Degree of Vertical Integration in the Moroccan Manufacturing Industry

The measurement of vertical integration poses many theoretical and practical problems that make it difficult to study the degree of integration at the firm level as well as at the industry level. To these various problems, it is added the lack of adequate information on the Moroccan industrial sector, which complicates more the task of the empirical studies in the matter.

### *Choice of Measure*

The problem of measurement remains major in any empirical work to study the degree of integration at the level of firms and industries. Generally, a company is said to be vertically integrated if it meets its needs for a good by producing it itself. In other words, the degree of integration can be expressed by the importance of internal transfers compared to the use of the market. However, it is often difficult to assess the importance of internal transfers. On one hand, the accounting documents kept by the companies are unable to provide an idea about this type of transfer, and on the other hand, this type of information is often confidential and, therefore, it can not be made available to people outside the firm.

In this logic, economic theory proposes many measures based on relatively available information. This is the case of the index proposed by Chapman and Ashton (1914) to measure the degree of integration of firms in the British textile industry. This index was constructed on the basis of equipment used by textile companies in the following two vertical stages: spinning and weaving. However, this index does not reflect internal transfers since the data used correspond to equipment inventories and not to production transferred from the spinning stage to the weaving stage. Using a different route, Gort (1962) proposed a measure of integration on the basis of the assignment of employment in a firm, by distinguishing the main activity from other auxiliary activities of the firm. However, the measure by the assignment of the job raises the same criticisms as the previous one. The fact remains that the ratio of Adelman (1955) is most widely used to measure the degree of integration and that, because of its theoretical foundations and especially its construction that is based on two economic variables relatively available (value added and turnover). This ratio, however, has two essential limits: the first is that it can be

influenced by other forces than vertical integration, especially the profitability of the company; the second is sensitivity to the position of a firm in the vertical chain.

We note, finally, the emergence of numerous measures based on the interactions and connections of the different industries by using the intermediate consumptions given by the input-output tables. This is the case, on one hand, of the index proposed by Maddigan (1981), which makes it possible to measure the degree of integration at the level of the companies, and on the second hand, that of Caves and Bradburd (1988), which retains a more aggregate level by taking the industry as the base unit.

Due to the limitations of the vertical integration measures proposed by economic theory, we opted for an index more suitable for a comparative analysis. This index is inspired essentially by the Bradburd and Caves (1988) study and measures the degree of integration of different Moroccan manufacturing industries, using data based on classification three-digits and two-digits of national nomenclature. Formally, the measure used can be written as follows:

$$VI_i = \sum_{j=1}^{N} (b_{ij} \frac{N_i}{N})$$

Where:

$VI_{i:}$ vertical integration index of industry $i$ .
$b_{ij:}$ Share of industry output $i$ used by industry $j$ .
$N_{i:}$ Number of industries vertically related to the industry $i$ .
$N$: Total number of industries.

The value of $VI_i$ is between 0 and 1. The more $VI_i$ tends to the unit, the more the industry is integrated.

*Results*

To determine the integration index, we used data from the input-output matrix of the 1990 Moroccan economy constructed by Bussolo and Roland-Host (1993), in addition to data from the annual surveys of the Industry and Commerce Ministry. Our choice for 1990 is motivated first by the availability of the input-output table for 1990, then by the fact that the year 1990 corresponds to the beginning of the implementation of the liberalization reforms and the restructuring of the Moroccan economy (the second wave of the structural adjustment program). By this choice, we want to determine the impact of these reforms on the behavior of firms that are trying to protect themselves from the competition (the impact of the reforms on the performance of firms and industries).

**Table 1.** *Breakdown of the Number of Industrial Segments by Degree of Vertical Integration*

| Classes | Number of Segments | % | Cumulative | % |
|---|---|---|---|---|
| [0 - 0.1 ] | 49 | 50.00 | 49 | 50.00 |
| [0.1 - 0.2 ] | 9 | 9.18 | 58 | 59.18 |
| [0.2 - 0.3 ] | 12 | 12.24 | 70 | 71.42 |
| [0.3 - 0.4 ] | 15 | 15.31 | 85 | 86.73 |
| > 0.4 | 13 | 13.27 | 98 | 100.00 |
| Total | 98 | 100.00 | - | - |

Note: 3-digit classification

Based on the empirical results (Table 1), we find that the Moroccan manufacturing industries present a low average and a wide dispersion of their degree of integration, with an average index of integration equal to 0.18. This average is all the more nuanced by the wide dispersion of the index, which oscillates between zero, for some branches, and 0.7 for others. However, the distribution of the different industries, according to the degree of integration, shows a high concentration of the latter in the slice grouping industries, with an index less than 0.1.

The classification by the degree of integration ranks the "textile and leather industry", followed by the "chemical and para-chemical industries" and the "metal and mechanical industries". We find, however, that the "food industry" remains the least integrated, followed, to a lesser extent, by the "electrical and electronic industries". We note a more or less dispersion of the integration's degree within the branches of a same sector, as is the case with the "core metal products", which is characterized by high capital intensity and relatively large economies of scale, with almost complete absence of private capital, and the "textile and knitting products" marked by a less intensive capital and a strong presence of private capital. The two branches are also differentiated by the orientation of the markets since the production of the former is exclusively destined to the local market, while the second is, for the most part, for export.

**Table 2**. *Distribution of the Number of Industrial Branches According to the Degree of Vertical Integration*

| classes | Number of branches | % | cumulative | % |
|---|---|---|---|---|
| [0 - 0.1 ] | 8 | 44.44 | 8 | 44.44 |
| [0.1 - 0.2 ] | 3 | 16.67 | 11 | 61.11 |
| [0.2 - 0.3 ] | 2 | 11.11 | 13 | 72.22 |
| [0.3 - 0.4 ] | 3 | 16.67 | 16 | 88.89 |
| > 0.4 | 2 | 11.11 | 18 | 100.00 |
| **Total** | **18** | **100.00** | **-** | **-** |

Note: Two-digit classification.

The least integrated branches belong essentially to the "agri-food industry", that is characterized by private equity participation and low capital intensity[1]. The food chain includes a very small number of vertical stages and most of the production is destined directly for final consumption. This is not, however, the case of the "electrical and electronic industries", where the degree of integration remains rather low due to the newness of this sector and the importance of technological knowledge and the high qualification of the labor force it requires.

*Determinants and Effects of Vertical Integration on the Performance of the Moroccan Manufacturing Industry*

In order to answer the questions relating to the determinants of vertical integration and its effects on the economic performance of firms and industries, we present two simple econometric models to test the hypotheses formulated by the theory of vertical integration and to verify the predictions of the theory. The cross-sectional data used relate to the year 1990 and are mainly the annual surveys of the Ministry of Industry and Trade.

The main determinants of vertical integration correspond, essentially, to the assumptions of monopoly theory and transaction costs. These variables reflect the effects of small numbers, asset specificity, barriers to entry, and uncertainty. The results of the model (Table 3) show a strong correlation between vertical integration and explanatory variables translated by values of $R^2$ and $R^2$ adjusted.

From a statistical point of view, the relationship does not seem to be random, because the value of the Fisher statistic is significant at a probability threshold of less than 1%. The signs of estimated coefficients correspond to those provided and, therefore, they cannot reject the predictions of the vertical integration theory. This result is further supported by the values of Student's t-statistics[2]. In addition, several empirical studies on the determinants of vertical integration give results similar to ours in the measurement of risk and uncertainty (e.g., Caves & Bradburd, 1988).

[1] With the exception of the "beverage and tobacco" branch, whose capital structure is, essentially, of a public nature.

[2]The estimated coefficients were all significantly different from zero at thresholds below 5%, with the exception of the uncertainty of demand variable, for which we do not find a fundamental explanation for its non-significance.

**Table 3.** *Results of the Model Estimation of the Determinants of Vertical Integration (Variable Explained: IV)*

| Variable | Coefficient | Standard Error | Standardized Coefficient | t | P (t) | Collinear | |
|---|---|---|---|---|---|---|---|
| | | | | | | Tolerance | VIF |
| Constant | -16.699 | 2.843 | - | -5.873 | 0.000 | - | - |
| IK | 3.084 | 0.406 | 0.997 | 7.597 | 0.000 | 0.674 | 1.484 |
| H | 4.709 | 1.080 | 0.634 | 4.359 | 0.001 | 0.549 | 1.823 |
| TMOR | -1.452 | 0.457 | -0.603 | -3.179 | 0.009 | 0.322 | 3.103 |
| TEPCA | 0.709 | 0.295 | 0.420 | 2.407 | 0.035 | 0.381 | 2.622 |
| TCMCA | -18.239 | 8.307 | -0.256 | -2.196 | 0.050 | 0.854 | 1.171 |
| INCD | 11.588 | 8.799 | 0.162 | 1.317 | 0.215 | 0.770 | 1.298 |
| *$R^2$* | *0.872* | | | | | | |
| *$R^2$ Adjusted* | *0.803* | | | | | | |
| *F* | *12.535* | | | | | | |
| *Meaning of F* | *0.000* | | | | | | |

Note: IV is the vertical integration index; IK, capital intensity; H, the Herfindahl Concentration Index ; TMOR, the minimum optimal relative size ; TEPCA, entry rate weighted by turnover; TCMCA, the average growth rate of turnover and INCD, the demand certainty.

Thus, the results of the model estimation confirm the assumptions of the theories of vertical integration, and show that the degree of integration of the Moroccan manufacturing industries is explained, for the most part, by the determinants specified by the monopoly theory and that of efficiency. The correlation between the actual signs and those predicted by the estimators clearly confirms the link between vertical integration, on one hand, and the degree of concentration of the industrial branches, their capital intensity, the level of barriers to entry, the importance of the economies of scale, the degree of growth of the industries and the level of risk of the demand, on the other hand.

Thus, the most integrated industrial branches are, in general, the most concentrated, the most capitalistic and having greater mobility of capital, less importance of economies of scale, and weak growth in demand coupled with high sales uncertainty. Our findings suggest that the manufacturing sector is largely influenced by market forces. This seems to be true because the study is carried out on data relating to the year 1990, which is a period of restructuring of the Moroccan economy marked, essentially, by the progressive liberalization and the disengagement of the State of the productive activity. The importance of the link between the market forces and the industrial structures in Morocco can thus be interpreted as a signal of a progressive trend of industrial enterprises towards the conditions of economic efficiency[1].

The chosen performance criterion focuses directly on the profitability of an industrial branch through the size of the gross operating surplus in relation to

[1]*A priori*, it seems difficult to predict the nature of the relationship between vertical integration and the performance criteria of industrial branches. On one hand, vertical integration involves both savings and costs, making it difficult to predict the net effect that results. On the other hand, the choice of the criterion representing the performance implies a restriction of the global vision on the effects of the integration, to the extent that a quantitative criterion can bring only a partial judgment there.

turnover. It is important for us to see the nature of the relationship between vertical integration and the profitability of a branch, as well as the correlation between profitability and the degree of integration.

Unlike the first model, the specification of the link between the margin rate and the explanatory variables did not require any transformation except for vertical integration.

**Table 4.** *Results of the Industrial Performance Model Estimate (Variable explained: TM)*

| ***Variable*** | ***Coefficient*** | ***Standard Error*** | ***Standardized Coefficient*** | ***t Student*** | ***P (t)*** | ***Collinear*** | |
|---|---|---|---|---|---|---|---|
| | | | | | | ***Tolerance*** | ***VIF*** |
| Constant | -4.73 E-02 | 0.021 | - | -2.202 | 0.048 | - | - |
| LnIV | -5.72 E-03 | 0.001 | -0.824 | -4.213 | 0.001 | 0.528 | 1.895 |
| IK | 3.070 E-05 | 0.000 | 1.519 | 4.562 | 0.001 | 0.182 | 5.502 |
| H | 0.188 | 0.034 | 1.343 | 5.565 | 0.000 | 0.346 | 2.890 |
| TEPCA | 4.666 E-03 | 0.002 | 0.383 | 2.081 | 0.060 | 0.596 | 1.678 |
| TMOR | -2.42 E-03 | 0.000 | -1.905 | -5.492 | 0.000 | 0.168 | 5.968 |
| $R^2$ | 0.758 | | | | | | |
| $R^2$ *Adjusted* | 0.657 | | | | | | |
| *F* | 7.519 | | | | | | |
| *Meaning of F* | 0.002 | | | | | | |

Note: *TM* is the margin rate; *IV*, the vertical integration index ; *IK*, capital intensity; *H*, the concentration index of Herfindahl; *TEPCA*, the entry rate weighted by the turnover and *TMOR*, the minimum optimal relative size.

The findings (Table 4) give relatively high values of $R^2$ and adjusted $R^2$; 0.758 and 0.657 respectively. At this level, we can emphasize that the unexplained part of the model may be due to the absence of the other determinants of business profitability in the model specification, especially the variables representing the strategies of the different firms. The value of Fisher's statistic is significant at a threshold less than 1%, which means that the link between the explained variable and the explanatory variables can not be due to the hazard.

Similarly, estimation of the coefficients associated to explanatory variables gives values significantly different from zero to thresholds less than 6%. Finally, the signs of the coefficients of the control variables are in line with our expectations. The profitability of the industrial branches seems indeed positively correlated to the degree of concentration, the capital intensity and the mobility of the capital, and negatively with the minimum dimension of the companies of these branches. This confirms the conclusions regarding the analysis of the characteristics of the Moroccan industry, according to which the degree of concentration and the level of the barriers to entry are relatively high and, thus, constitute an advantage for the existing enterprises and, particularly, for those operating in relatively concentrated markets.

However, profitability has been found to be negatively correlated with the degree of vertical integration. This shows that the average margin rate of the industrial branches is much higher as they have a low degree of vertical

integration. The most logical explanation of this result is undoubtedly linked to the importance of the costs generated by vertical integration, particularly those of bureaucracy and the big size. This does not mean, however, that the high degree of vertical integration of the industrial branches is synonymous with the economic and organizational inefficiency of these branches. In fact, the low profitability of the most integrated industries can be explained mainly by specific considerations to these industries. In this case, the high degree of the integration of firms implies their greater efficiency and the vertical structure at the expense of the high costs of vertical integration and the low profits that result. Thus, the results show that vertical integration is often a costly strategy that should be used only for economic reasons and organizational efficiency which can justify the costs it generates.

## Conclusion

Vertical integration is often explained by one of the following considerations: (i) The desire of companies to maintain or enhance their market power at the expense of actual and/or potential competitors. In this case, the vertical integration does not fit into a logic of improving the economic efficiency. On the contrary, the integration decision is justified by anti-competitive considerations designed to weaken or oust the rival firms and to deter potential entrants from entering the market. In this case, integration can be used as a means of foreclosure of rival firms, price crushing or strengthening the barriers to entry.

Thus, improving the market power of integrated firms is generally at the expense of actual and potential competitors and it therefore implies a deterioration of social welfare and economic efficiency. (ii) The willingness of firms to choose the most efficient form of organization in the coordination of production. In this case, vertical integration is motivated, essentially, by the desire to improve the economic efficiency, in the sense that the internalization of activities provides substantial savings compared to the solution of the market relationship. It results, therefore, from an arbitrage between the advantages and the disadvantages of the different economical institutions for the sole purpose of improving efficiency. As such, we emphasize that the choice of integration prevails, generally, in case of market failure, in particular, in case of non-satisfaction of certain conditions of perfect competition (such as the atomicity of operators or market transparency). In these cases, vertical integration often implies an improvement in economic efficiency by addressing the problems of market failure.

On the empirical level, the Moroccan manufacturing industry is essentially characterized by the weakness and dispersion of the degree of vertical integration. This finding is explained, on one hand, by the relatively weak weight of the industrial sector in the Moroccan economy, and on the other hand, by the disparities which characterize the different industries. Indeed, the industrial sector was often relegated to second place in the priorities of the development strategies in Morocco, which insisted more on the import-substitution and export industries, whose main purpose was the economy of foreign exchange and the elimination of

external deficits. This explains also the wide dispersion of the degree of vertical integration of the Moroccan manufacturing industries. Indeed, we stress a high degree of integration of the export-oriented branches (textile products) and those whose production is intended to satisfy internal needs and the substitution of imports (basic metal products). In contrast, the least integrated industries generally correspond to basic food products and mechanical, electrical and electronic equipment.

However, the study of the degree of vertical integration in the Moroccan industry reveals an important correlation between the vertical integration and market factors. In fact, the adoption of the structural adjustment program in the mid-1980s and the policy of progressive liberalization of the Moroccan economy have significantly improved the functioning of the industrial enterprises and markets. Thus, the degree of integration of the industrial branches is explained, essentially, by the basic conditions and the structures of the industrial sector, such as, the degree of concentration, the capital intensity, the level of the barriers to the entry, the importance of economies of scale and the growth rate of sales. These factors also reflect the hypotheses of the main explanatory theories of vertical integration, in particular those of monopoly and efficiency.

Our paper reveals, however, a negative correlation between the degree of vertical integration and the profitability of the industrial firms. This confirms the idea that integration is usually accompanied by significant costs (bureaucratic costs, costs resulting from changes in incentives) that offset the savings that result (savings in transaction costs, savings related to monopoly power).

## References

Adelman MA (1949) Integration and Antitrust Policy. *Harvard Law Review*, 63(1): 27-77.

Adelman MA (1955) "Concept and Statistical Measurement of Vertical Integration". In Stigler GJ (Ed), *Business Concentration and Price Policy: A Conference of the Universities.* National Bureau Committee for Economic Research (pp. 281-330). Princeton University Press.

Alchian A, Demsetz H (1972) Production, Information Costs and Economic Organization, *American Economic Review* 62: 777-795.

Allain M-L, Chambolle C, Rey P (2014), Vertical Integration as a Source of Hold-up, Working Paper n.IDEI-836, *Toulouse School of Economics*. Available at: http://idei.fr/sites/default/files/medias/doc/wp/2014/wp_idei_836.pdf

Arrow K (1975) Vertical Integration and Communication. *Bell Journal of Economics* 6(1): 163-183.

Bain J (1955) *Barriers to New Competition*. Cambridge. Mass: Harvard University Press.

Bárcena-Ruiz JC, Garzón MB (2018) *Privatisation and Vertical Integration under a Mixed Duopoly*. *Economic Systems*, *Elsevier*, 42(3): 514-522. Available at: https://ideas.repec.org/a/eee/ecosys/v42y2018i3p514-522.html.

Baumol wJ (1959) *Business Behaviour, Value and Growth*. Macmillan, London.

Belghazi S (1997) *Concurrence Interne et Compétitivité Externe de l'Industrie Marocaine*. Publications du C.E.R.A.B.

Bussolo M, Roland-Holst D (1993) A Detailed Input-Output Table for Morocco, 1990, O.C.D.E./GD(93), 180, Technical Paper n°90.

Caves R, Bradburd R (1988) The Empirical Determinants of Vertical Integration. *Journal of Behavior and Organization*, 9: 265-279.

Chapman S, Ashton T (1914) The Size of Business Mainly in the Textile Industries. *Journal of the Royal Statistical Society*, pp. 469-549.

Clarke R (1985) *Industrial Economics*. Blackwell, Oxford.

Coase R (1937) The Nature of the Firm. In Williamson O, Winter S (eds) *The Nature of the Firm: Origins, Evolution and Development*, Oxford University Press, 1991.

Crocker D (1983) Vertical Integration and the Strategic Use of Private Information. *Bell Journal of Economics*, 14(1): 236-248.

Cyert R, March J (1963) *A Behavioral Theory of the Firm*. Prentice Hall.

Goldberg V (1976) Toward an Expanded Economic Theory of Contract. *Journal of Economic Issues*, 10: 45-61.

Gort M (1962) *Diversification and Integration in American Industry*. Princeton University Press.

Green, J (1974) «Vertical Integration and Assurance of Markets», *International Economic Association Series*, pp. 177-210.

Grossman S, Hart O (1986) The Costs and Benifits of Ownership: A Theory of Vertical and Lateral Integration. *Journal of Political Economy*, 94: 691-719.

Hart O, Moore J (1990) Property Rights and the Nature of the Firm. *Journal of Political Economy*, 98: 1119-1158.

Hay G (1973) An Economic Analysis of Vertical Integration. *Industrial Organization Review*, 1(3): 188-198.

Holmström B, Tirole J (1989) The Theory of the Firm. *Hand Book of Industrial Organization*. In Schmalensee R, Willig R (eds), North Holland.

Klein B, Crawford R, Alchian A (1978) Vertical Integration, Appropriables Rents and the Competitive Contracting Process. *Journal of Law and Economics*, 21: 297-326.

Knight F (1933) *The Economic Organization*, 1933

Krattenmaker T, Salop S (1986) Anticompetitive Exclusion: Raising Rival's Costs to Achieve Power over Price. *Yale Law Journal*, 96: 209-293.

Machlup F (1967) Theories of the Firm: Marginalist, Behaviorist and Managerial. *American Economic Review*, pp. 1-33.

Maddigan R (1981) The Measurement of Vertical Integration. *Review of Economics and Statistics*, 63(3): 328-335.

Ministère du Commerce, de l'Industrie et de l'Artisanat (1998), *Transformation Industry*.

Monsen RJ Jr, Downs A (1965) A Theory of Large Managerial Firms. *Journal of Political Economy*, 73(3): 221-236.

Perry M (1978) Price Discrimination and Forward Integration. *Bell Journal of Economics*, 9(1): 209-217.

Perry M (1982) Vertical Integration by Competitive Firms: Uncertainty and Diversification. *Political Economic Journal*, 49: 201-208.

Perry M (1984) Vertical Equilibrium in a Competitive Input Market. *International Journal of Industrial Organization*, 2: 159-170.

Perry M (1989) Vertical Integration: Determinants and Effects. *Handbook of Industrial Organization*. In Schmalensee R, Willig R (eds), North Holland.

Riordan M (1990) What is Vertical Integration. In Aoki M, Gustafsson B, Williamson O (eds), *The Firm as a Nexus of Treaties*, Oxford University Press.

Salinger M (1988) Vertical Mergers and Market Foreclosure. *Quarterly Journal of Economics*, pp. 345-356.

Scherer F (1990) *Industrial Market Structure and Economic Performance*. Houghton Mifflin Company.

Schmalensee R (1973) A Note on the Theory of Vertical Integration. *Journal of Political Economy*, 81: 442-449.
Spengler J (1950) Vertical Integration and Antitrust Policy. *Journal of Political Economy*, 53: 347-352.
Stigler G (1951) The Division of Labor is Limited by the Extent of the Market. *Journal of Political Economy*, 59: 185-193.
Stigler G (1968) *The Organization of Industry*. Homewood.
Wallace D (1937) *Market Control in the Aluminium Industry*. Cambridge: Harvard University Press.
Williamson O (1967) *Corporate Control and Business Behavior*. Prentice Hall Incorporation.
Williamson O (1985) *The Economic Institutions of Capitalism*. New York Free Press.
World Bank (1993) *Développement de l'Industrie Privée au Maroc (Development of Private Industry in Morocco)*, 2: 1, Report n°11557-MOR.