

Linotype's design of new Greek typefaces for photocomposition
in the Greek printing market, 1970-1980

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Declaration

I confirm that this is my own work and the use of all material from other sources has been properly and fully acknowledged.

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Abstract

This thesis explores Linotype's design of new Greek typefaces for photocomposition in the Greek printing market between 1970 and 1980. The thesis draws on original archival research and interviews in Greece, the U.K. and the U.S. in order to build a reliable picture of the design and manufacture of the typefaces. Specifically, it seeks to establish: the reasons that prompted Linotype to embark on a programme of Greek type design; whether this design work constituted a programme, and if so how it came about; the role of the Athens Publishing Center in facilitating Linotype's efforts to enter the nascent photocomposition market; and which typefaces were developed, and their design process discovered through the documentary evidence of the people who contributed to their design and manufacture. The collaboration of Linotype staff, whose combined expertise included type design, printing technology and business, with their local agent and their clients lies at the heart of this research and is discussed throughout the thesis. This allows conclusions to be drawn about the relationship of the new Greek type designs to the Latin typefaces they were extensively modelled on. The thesis contributes new information to the existing literature on Greek typographic history in the second half of the twentieth century, and aims to facilitate a greater understanding of the role of photocomposition in Greek typography and printing, which is a subject that has been little touched upon in the available literature in this field.

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Initial notes

Illustrations

Scale and provenance of illustrations are provided in the accompanying captions.

Abbreviations

CADA: Constantinos A. Doxiadis Archive, Benaki Museum, Athens, Greece

DTGC: Department of Typography & Graphic Communication, University of Reading, U.K.

LGA: Linotype Greek Archive at DTGC

NMAH: Mergenthaler Linotype Company Records, 1905-1993, Archives Center, National Museum of American History, Smithsonian Institution, Washington D.C., U.S.A.

SBL: St. Bride Library, London, U.K.

WTC: Walter Tracy Correspondence at DTGC

WTP: Walter Tracy Papers at SBL

Bibliographical references, interviews and archival material

This thesis generally follows the guidelines of the MHRA referencing style. Bibliographical references are given in full when they appear for the first time, and thereafter provided in an abridged version using the following format:

Tracy, 33-34.

When more than one article or publication by the same author is referenced, the abridged version used in order to distinguish the exact source is the following:

Wallis, *A Concise Chronology of Typesetting Developments, 1896-1986*, 38.

Wallis, *Typomania*, 48.

References to archival material (such as correspondence, memos, and other office documents) are given in full when they appear for the first time using the following format:

Mike Parker to Albert Salt, 'Athens Publishing Centre, Athens, Greece', 6 February 1970. File 20, Greek, WTC, DTGC.

Thereafter they are provided in an abridged version using the following format:

Mike Parker to Albert Salt, 'Athens Publishing Centre, Athens, Greece', 6 February 1970.

References to interviews conducted are given in full when they appear for the first time using the following format:

Carter, Matthew, personal interview, TypeCon, Washington D.C., USA, 2 July 2014.

Thereafter they are provided in an abridged version using the following format:

Carter, personal interview, 2 July 2014.

1 Introduction

Typefaces are produced in order to fulfil the multiple functions of written language, and enable clear communication in the dissemination of information. They do not exist in a vacuum, rather they are products of historical periods characterised by particular typemaking and typesetting technologies, and their design is often influenced by prevailing cultural trends and commercial considerations.

This thesis investigates a number of Greek typefaces which were the result of such a confluence of factors. More specifically, starting in 1970 the type manufacturer Linotype¹ began a programme of Greek type design for photocomposition with the intention of increasing the sales of their phototypesetters in the Greek printing market. The programme lasted until 1980, and some of these typefaces that were manufactured and are examined in this thesis are: Caledonia Greek (1970), Helvetica Greek (1971), Optima Medium Greek (1972), Cadmus (1974), Century Schoolbook Greek (1976-77), and Baskerville Greek (1978).

Photocomposition entered the Greek printing industry relatively late compared to the American and European printing industries, which was unsurprising for a printing market that was geographically peripheral and typographically limited. Nonetheless, due to the postwar economic growth Greece was experiencing, its printing market was amenable to new technologies and some businesses began investing in photocomposition before its widespread use in the 1980s. Linotype's relationship with one such business, the Athens Publishing Center, spearheaded its entry into what was then a nascent photocomposition market in Greece.

1.1 Research questions

The thesis utilises archival material (see 1.2) and interviews (see 1.3) to address the following questions:

- What were the reasons that prompted Linotype to embark on Greek type design between 1970 and 1980?
- Did this design work constitute a programme, and if so how did this come about?
- What was the role of the Athens Publishing Center in facilitating Linotype's efforts to enter the nascent photocomposition market in Greece?
- Which typefaces were developed and why?
- What was the design process?²

¹ Linotype consisted of the Mergenthaler Linotype Company (MLCo), which was the parent company based in New York, U.S., and a number of affiliates: Linotype & Machinery (L&M) and Linotype-Paul in the U.K. (see also footnote 189); and Mergenthaler Setzmachinen-Fabrik GmbH and Linotype GmbH in Germany, which merged in 1973 to become Mergenthaler-Linotype GmbH. The type foundry Stempel A.G., where Linotype was a majority shareholder, manufactured matrices exclusively for the Linotype machines, and later friskets for Linotype's phototypesetters.

² In this research, the definition of the design process relates to how a type design is produced, and includes roughs and type drawings, testing and trial proofs, as well as design decisions that are relevant to the printed type image.

In answering these questions, the thesis draws attention to new information on lesser known aspects of Linotype's activities in Greece, involving a team of people whose combined expertise included type design, printing technology and business.

1.2 Archival sources

Central to this research is the Linotype Greek Archive at the Department of Typography & Graphic Communication, University of Reading. The archive was part of Matthew Carter's personal papers, and was given to the Department by Carter in 2008. It contains material that spans a period of 20 years — from 1961 to 1981 — and concerns the design of the following typefaces: Helvetica Greek and Optima Greek, designed by Matthew Carter; Century Schoolbook Greek and Baskerville Greek, also designed by Carter with the assistance of Tim Holloway; Caledonia Greek, whose design development was complex and had the input of many different people. Specifically, the material includes: miscellaneous office documents including some handwritten notes; correspondence including letters, memos and telexes; typesetting and character trial proofs; type drawings; and printed type specimens. The documents in the Linotype Greek Archive are unsorted; for example, the correspondence has many chronological gaps and, for the most part, records the communications between key Linotype staff. There are very few letters preserved that were directly sent to Linotype from Greek clients — and vice versa — making it somewhat difficult to ascertain the exact nature of their businesses (i.e. whether they were general printers or they focused solely on newspaper composition and production). Furthermore, relevant type drawings³ made for the Greek typefaces are not included. The type drawings that are contained in the archive are copies of the original drawings of the Latin typefaces (i.e. Baskerville, Century Schoolbook, etc.) that the Greek adaptations were based on. This lack is partly remedied by the inclusion of a good number of trial typesetting proofs that, to some extent, help trace the development of some of the typefaces. Finally, the handwritten notes document thought processes or information from conversations, but the shorthand manner in which they have been written often makes it difficult to place them in a specific context.

In the early stages of the research, a significant amount of time was spent going through each item in the Linotype Greek Archive. The correspondence was read and sorted into a chronological order in order to establish a timeline of events. This process also helped to partly establish Linotype's company structure, and identify key staff and clients. Additional information concerning the company's type manufacturing processes was sought through secondary sources. Once all the existing information was arranged in a coherent way, it became easier to identify gaps in knowledge.

In order to address these gaps, access to primary sources in other archives was sought in order to: verify and re-evaluate existing information, particularly in the light of new evidence from other sources; and fill as many gaps as possible in the narrative arising from the Linotype Greek Archive. Additional material has been consulted in the following archives: Walter Tracy's correspondence at the Department of Typography & Graphic Communication, University of Reading; the Costantinos A. Doxiadis Archive at the Benaki Museum in Athens; the Mergenthaler Linotype Company Records at the Museum of

³ In this research, the term describes technical drawings of an engineering standard that are produced in type drawing offices, and are part of the type manufacturing process.

American History, Smithsonian Institution, Washington D.C.; and Walter Tracy's personal papers at the St. Bride Printing Library in London. In addition to these archives, back issues from 1958 to 1988 of the trade journal *Η Τυπογραφία* (*The Typography*) were consulted in order to gauge the pace of technological developments in the postwar Greek printing trade, especially with regard to photocomposition, and to ascertain the response of Greek printers and typographers to the rapid changes that were transforming their industry at the time.

Walter Tracy's correspondence at the Department of Typography & Graphic Communication was accessed at regular intervals over the course of this research. In particular, it has been used extensively in order to trace the history of the design of Caledonia Greek. Moreover, many of Tracy's exchanges with Mike Parker, Matthew Carter, and various other staff have been illuminating with regard to Linotype's business practices and activities in the process of trying to determine the company's corporate structure. On the other hand, the St. Bride Printing Library, which holds a small number of Walter Tracy's personal papers and correspondence in a partially organised state, yielded the least material; although some documents were of interest, they were not ultimately relevant to this research. The Mergenthaler Linotype Company Records in Washington D.C. is an extensive collection of business documents pertaining to different aspects of type manufacturing. The collection is unsorted; a preliminary inventory is the only guide to the contents of numerous large boxes. Some of the materials it includes are business correspondence, reports, manuals, client complaints, as well as a multitude of miscellaneous office documents. Due to time constraints, only a selection of boxes could be examined. Much of the material found relating to this research was additional correspondence — Mike Parker's for the most part — which was synthesised along with Walter Tracy's correspondence and that from the Linotype Greek Archive in order to gain a better understanding of events and processes regarding the development of the typefaces included in this thesis.

Greek printing companies which purchased Linotype phototypesetters, and about which some records are included in the Linotype Greek Archive, are the Athens Publishing Center (APC), founded by the urban planner Constantinos Doxiadis, and Fotron S.A. Graphics Arts, owned by E. Valasakis (for the latter, see chapters 2 and 4). Additional sources about APC were sought at the Constantinos A. Doxiadis Archive in Athens, which provided: office documents announcing the launch of APC as well as outlining Doxiadis's design strategy regarding key publications of the Doxiadis Organization (DO); information about the installation of the Linofilm Super-Quick phototypesetter from back issues of the Doxiadis Associates' newsletter *DA Review*; photographs of the APC printing setup; and examples of DO publications printed by APC. This material augmented the extant information from the Linotype Greek Archive, and combined with interviews conducted with past members of staff both at APC and DO (see 1.3), helped put together a more complete picture of the kind of business APC was and illuminate its relationship with Linotype.

1.3 Interviews

Interviews are carried out to extract personal testimonies based on first-hand experience, and opinions of individual informants. These can be considered primary sources equivalent to archival records.⁴ Matthew Carter, to whom the Linotype Greek Archive belonged, was

⁴ Tosh, John, *The Pursuit of History. Aims, Methods and New Directions in the Study of Modern History (Fifth Edition)*, (Harlow: Longman, 2010), 313.

interviewed in his capacity as the primary type designer of the majority of the typefaces examined in this thesis. Additional interviews were conducted with: Sophia Zarabouka, the principal designer at the Doxiadis Organization, who also provided feedback to Matthew Carter during the design of Helvetica Greek; Nicholas Avronidakis, who was the Managing Director of APC from 1966 to 1978; Tania Papanikolaou, who was the manager of the photocomposition department at APC for most of the 1970s; Maro Kabouri, who worked at Lycabettus Press, the publishing arm of the Doxiadis Organization; and the engraver and type designer Takis Katsoulidis, who has taught typography both at the Doxiadis School and the Technological Educational Institute of Athens. Efforts to track down Costas Chryssochoides, the Greek Linotype agent in Athens, and his family were unsuccessful. His company, Chryssochoides and Sons, does not exist any more, and none of his business records were located in public archives in Athens. Other key people frequently referred to throughout this thesis such as Constantinos Doxiadis, Walter Tracy and Mike Parker have passed away.

Interviews have the advantage of bringing the past vividly to life whilst providing authentic evidence. Nonetheless, the passage of time and the impact of subsequent experience tend to modify memory, therefore a personal testimony can never be a pure distillation of the past.⁵ Considering that the events described in this thesis took place approximately 45 years ago, Carter's recollection of the period he worked for Linotype was remarkably good. He verified information and provided a vivid impression of his business trips to Athens with Mike Parker in order to meet with clients. Additionally, he described his process of designing type for photocomposition, and discussed a number of technical issues that he came up against at the time. However, Carter had almost no recollection of the Greek clients he met, and could offer a limited amount of information about them.

On the other hand, Sophia Zarabouka did not recall Matthew Carter or Mike Parker at all, or her role as consultant in the design of Helvetica Greek. However, she was able to describe her experiences at DO clearly, outlining the design challenges and the typographic limitations she faced as a graphic designer, and gave an evocative account of Constantinos Doxiadis's personality and her relationship with him.

Nicholas Avronidakis and Tania Papanikolaou were able to give a wealth of information regarding the structure and the day-to-day running of APC, including the numbers of staff employed, the jobs that were undertaken and the clients it had. Moreover, Mr. Avronidakis was also able to remember much about the technical setup of APC and of the Linofilm Super-Quick, information that was useful when comparing it against archival Linotype sources. Maro Kabouri gave helpful information about the Lycabettus Press, and provided examples of both DO, as well as external, publications that were printed at APC.

Finally, Takis Katsoulidis usefully outlined aspects of the Greek script that pertained to its typographic adaptation, recalled his time teaching at the Doxiadis School and described his own experience of designing Greek typefaces for photocomposition. Where possible, the personal testimonies obtained throughout the course of this research have been evaluated carefully and used judiciously; any information that has been given has been cross-referenced against other relevant documentary sources.

⁵ *Ibid.*

1.4 Typeface evaluations

The evaluations of typefaces were conducted by a close analysis of trial character and text setting proofs, and type specimens contained in the Linotype Greek Archive. Although typeface evaluations cannot avoid a degree of subjectivity and personal preference, criteria have been employed to provide as consistent and unbiased an approach as possible. They are:

- consistency — the proportions of characters in relation to each other, and includes alignment, spacing, kerning, the positioning of diacritics, and stroke modulation,
- readability — the quality of visual comfort when reading a body of continuous text,
- balance or harmonisation between the Greek adaptation and its Latin counterpart.

The consistency of a typeface design contributes to the distinctiveness and legibility of characters, and produces a typeface that is readable. Since the majority of the typefaces that are examined in this thesis are adaptations modelled on popular Latin ones, the balance or harmonisation between each Greek typeface with its Latin counterpart is also taken into account and discussed. This entails an understanding of the inherent design elements of the Greek script, its established typographic conventions, including the formal varieties of individual characters, and the cultural and historical traditions that it belongs to. One of the biggest challenges that these Greek typeface adaptations presented was finding a way to harmonise two scripts with inherently different design characteristics which are the product of distinct calligraphic traditions. Therefore, in order to support the typeface evaluations, Appendix A contains a short survey of the typographic features of the Greek script.

1.5 Limitations of the research

Every study, no matter how well it is conducted and constructed, has limitations. The quality, quantity and accessibility of available primary sources have, to a very large extent, defined the limits of this research. A considerable issue that was apparent early on is that almost all correspondence found in any of the archives previously mentioned is outgoing — meaning that it records the communications from Linotype staff to their colleagues and occasionally to Greek clients. In contrast, there is very little incoming correspondence preserved, that is communications from Greek clients to Linotype staff. This lack of information has made this research somewhat one-sided as feedback on the design of typefaces or other kinds of responses from clients have, at best, to be inferred from the existing sources. In that sense, this thesis has a certain bias; the available archival records carry Linotype's perspective, and there is little to explain or demonstrate the Greek clients' standpoints or positions.

Most of the archives that were used are collections of business records. These, as a rule, are not exhaustive because companies do not document every aspect of their business processes. They provide inherently incomplete accounts of events and processes simply because much has disappeared, either accidentally or deliberately. Also, much of what happened in the past leaves no material trace.⁶ Evans observes that archives are the product of the chance survival of some documents and the corresponding chance of loss or deliberate destruction of others. He likens historical research to a jigsaw puzzle where the pieces are scattered all over the house in several boxes, some of which have been destroyed,

⁶ Tosh, 180.

and even after these are put together, a significant number of the pieces are still missing.⁷ For example, the Mergenthaler Linotype Business Records in Washington D.C. show that the company kept meticulous files on machine malfunctions or other client complaints for specific orders, presumably in anticipation of any future litigation issues. However, they did not keep files of positive feedback from satisfied customers, if indeed they received any.

On the other hand, records that directly arise from everyday business are, according to Tosh, records of history par excellence; the most revealing source is that which was written with no thought for posterity, leaving open the task for interpretation.⁸ The Linotype business correspondence records staff opinions and their ongoing discussions on particular projects or issues, their decision-making process, and occasionally their personal thoughts. The archive, therefore, reveals the company's structure, its vested interests, administrative routines and record-keeping procedures — all of which provides mostly reliable information and wider context for the main business of manufacturing typefaces.

As already mentioned in 1.3, a number of interviews were conducted as a way to collect additional information about decisions that were made, and to seek clarifications about events and processes that influenced the design of typefaces. Personal testimonies are centred on the experiences and opinions of the interviewees, and they are often evocative and emotionally powerful.⁹ However, these testimonies are not a pure distillation of the past. Memories are filtered through subsequent experience or influenced by hindsight. They can be overlaid by other factors, such as nostalgia or grievance.¹⁰ In some instances during the course of this research, interviewees provided information that contradicted archival sources, but more often than not they had simply forgotten events or people in the past, or could only partially recall them (see 1.3).

Lack of detail from first-hand accounts and from specific archival sources undoubtedly affected the typeface evaluations in this thesis. It is possible that additional evidence, such as detailed briefs, type drawings, client feedback and printed matter, may have illuminated aspects of the design process which, in turn, may well have afforded a different perspective on their development and design assessment.

With no available literature covering aspects of the use of photocomposition in Greece, a great effort has been made to provide relevant historical context and a reliable overview of the impact of photocomposition in the Greek printing market. In this instance, information has been drawn from reliable secondary sources. The most prominent of these include: for information pertaining to the Greek printing industry, past issues of the aforementioned trade journal *Η Τυπογραφία* covering a period of 30 years (1958-1988) and Nikos Leandros's study on Greece's mass media *Μαζικά Εντυπα Επικοινωνίας στην Ελλάδα. Οικονομικές και Τεχνολογικές Προσεγγίσεις*; for key dates and technical developments in photocomposition, John W. Seybold's *The World of Digital Typesetting*, and Lawrence Wallis's *Concise Chronology of Typesetting Developments 1886-1986*, the anthology of articles *Typomania*, as well as selected articles from the Penrose Annuals.

Unavoidably, the interpretation of primary sources, both oral and written, involves a degree of subjectivity. Most of them can be construed in a variety of ways, and as we all bring

⁷ Evans, Richard J., *In Defence of History*, (London: Granta, 1997), 87.

⁸ Ibid. 181.

⁹ Tosh, 313.

¹⁰ Ibid., 320.

our own thoughts to bear on them, they can have a significant effect on how a document is read.¹¹ Evaluation and interpretation throughout this research have been conducted hand-in-hand with the research questions sustaining the focus of the research, and helping to ascertain the relevance of new pieces of information — be it from other archives or from interviews conducted. In order to provide a degree of objectivity and consistency, new information was evaluated by cross-referencing it against the existing evidence. This activity ensured that any assumptions made along the way were tested, and often revised before any conclusions were drawn.

1.6 Structure of the thesis

The structure of the thesis aims to address the research questions laid out in section 1.1. Additionally, the events surrounding the development of each typeface are dealt with chronologically in order to ensure the clarity of the narrative. **Chapter 2** gives an overview of the postwar Greek printing industry in order to provide the historical context in which photocomposition was introduced and Linotype's commercial activities took place. The chapter also lays the groundwork for discussing the importance Linotype placed in the development of typefaces in order to increase the sales of its typesetting machines in a given market, and the circumstances that led to the design of Caledonia Greek, both of which are examined in **chapter 3**. **Chapter 4** discusses the launch of the Athens Publishing Center in order to underline the slow adoption of photocomposition in the Greek printing market, and to demonstrate how the relationship between APC and Linotype facilitated the latter's entry into the nascent photocomposition market in Greece. The design of Helvetica Greek for photocomposition, examined in **chapter 5**, was also a product of Linotype's continuing relationship with APC. The way the brief was developed as well as the design process demonstrate the commercial considerations that underpinned Linotype's choices for producing new typefaces. Helvetica Greek was also the first typeface designed as part of a programme of Greek type design specifically for photocomposition which started in 1970 and finished in 1980. **Chapter 6** further demonstrates which Greek typefaces were developed and why as part of Linotype's programme of Greek type design, giving an account of the development of an additional four Greek typefaces — Optima Medium Greek, Cadmus, Century Schoolbook Greek and Baskerville Greek.

¹¹ Evans, 84-92.

2 The Greek printing industry in the postwar period

This chapter gives an overview of the printing industry in postwar Greece in order to establish the appropriate historical context in which Linotype's programme of Greek typefaces took place. It consists of four sections: section 2.1 gives a short survey of the economic conditions that were developing in postwar Greece, and positions the Greek printing industry within it; section 2.2 examines more closely the professional training of Greek printers and typographers, and the conditions in which they worked in order to highlight the ways both these factors impacted the quality of work produced; section 2.3 investigates the role of the local type foundries to explain the lack of variety and quality of typefaces in the printing trade; the impact of photocomposition in the Greek printing industry is examined in section 2.4, followed by a conclusion to the chapter.

2.1 Printing and publishing in postwar Greece

Greece emerged from the Second World War having endured severe damages, both from the German occupation and the Civil War⁷ that directly followed. The country's economy was crippled: the countryside and the industrial infrastructure was in ruins and the government bankrupt.⁸ Due to the strategic importance of its geographic location, Greece was one of the major recipients of aid under the Marshall Plan.⁹ Between 1945 and 1950 Greece received US\$ 2.1 billion in all forms of aid, but only a small amount of these resources was used towards war reparations.¹⁰

When the aid began to run out after 1950, the country prioritised economic growth. The economic model that prevailed was that of a mixed economy where the public sector was seen as the motor of the national economy. By 1963 state bureaucracy was the fastest growing employer in the nation.¹¹ A number of additional measures, including the devaluation of the national currency and the lifting of most controls, helped the growth of the national economy further. The results were increased exports as well as private savings, and stabilised prices in the years that followed. There were also incentives aimed to attract foreign investments and boost foreign capital, such as cheap electric power, tax breaks and the repatriation of profits.¹² Moreover, the rebuilding of cities, towns and villages boosted

7 The Greek Civil War (1946-49) was a polarised struggle between the Conservative and Communist parties, each aiming to fill the power vacuum left by the Italian-German occupations. The conflict ended with the defeat of the Democratic Army, and the official ban of the Greek Communist Party from the political life of the nation which lasted until the fall of the military junta and the restoration of democracy in 1974. For details, see Clogg, Richard, *A Concise History of Greece (2nd edn)*, (Cambridge: Cambridge University Press, 2002), 98-141. During the Civil War, 80,000 people died, 20,000 were detained in government prisons and concentration camps, and approximately 5,000 were executed. Additionally, the Ministry of Welfare listed 1,617,132 people as homeless and destitute in their own country. Another 80-100,000 had fled the country as a result of the outcome of the Civil War, and had resettled in various parts of the Iron Curtain. See Gallant, Thomas W., *Brief Histories. Modern Greece*, (London: Arnold Publishers, 2001), 178-179.

8 Gallant, 179.

9 Koliopoulos, John S., and Veremis, Thanos M., *Greece: The Modern Sequel. From 1821 to the Present* (London: C. Hurst & Co. Ltd., 2002), 172.

10 Clogg, 142-143. See also Gallant, 180; Koliopoulos and Veremis, 172.

11 Gallant, 185.

12 Koliopoulos and Veremis, 172-173.

the building trade which, in turn, absorbed a great number of labourers. Over 1,000 miles of new roads were laid down, old roads were refurbished and hydro-electricity dams were erected. Merchant shipping significantly increased its annual revenues, and the tourist industry evolved rapidly as faster and cheaper means of travel along with the country's combination of rich history, sea and sun started to attract tourists.¹³ The intense period of restructuring and urbanisation, which lasted from 1952 until 1972, changed Greece rapidly and irrevocably; many cities had grown immensely, especially Athens, which exerted an increasing political, cultural, social and economic influence over the rest of the country, resulting in a profound change of lifestyles for many people.¹⁴

Nonetheless, signs of fragility remained in the economy. Agriculture, despite becoming mechanised and more efficient, remained the least profitable sector. Farming villages in the lowlands were able to modernise their production methods, but mechanised agriculture proved difficult to implement in the upland mountainous terrain. The inability of agricultural workers, many of whom were young, to earn a living in their own towns and villages resulted in two emigration streams: an internal one towards urban centres such as Athens and Thessaloniki, which had witnessed a considerable industrial growth; and an external one towards the U.S., Canada, Australia and the industrialised European north. Although emigration eased the pressure of an unemployed surplus population and the remittances sent home helped sustain the economy, in the long run it prevented the development of a fully-functioning industrial economy.

In the 1950s and 1960s, small and medium industries, which were mostly family-owned, experienced an unprecedented expansion largely due to the surplus, low-cost working hours of family members.¹⁵ However, the reluctance of commercial banks to provide these industries with cheap credit for the improvement of their infrastructure was detrimental to their continuing development as well as to economic growth as a whole. Therefore, in the absence of an industrial framework, the Greek economy did not manage to overcome a major feature of its underdevelopment: its weak manufacturing sector.¹⁶

In 1958, Greek printing and publishing, being a relatively minor branch of the manufacturing sector, accounted for only 2.25% of employment. Thirty years later, in 1988, the percentage had risen by a single point, at 3.24%. These figures are in contrast to the corresponding ones in western Europe and the USA, where in 1984 printing and publishing accounted for 7.4% of total employment in manufacturing.¹⁷ Additional factors contributing to the slow pace of development of the printing and publishing industry were: Greece's peripheral status in Europe; the complexities of the Greek script; and the small size of the country and its population which resulted in low consumption of printed matter per capita.¹⁸ Moreover, the low average income per capita, the low levels of literacy, and the country's

¹³ Gallant, 181-184.

¹⁴ Ibid., 174.

¹⁵ Koliopoulos and Veremis, 173.

¹⁶ Mouzelis, Nicos P., *Modern Greece. Facets of Underdevelopment*, (New York: Holmes & Meier Publishers, Inc., 1978), 119.

¹⁷ Simmons, Colin and Leandros, Nikos, 'Printing and publishing in Greece: "flexibility" and the process of innovation, 1979-1991'. *Byzantine and Modern Greek Studies*, 20 (1996), 146.

¹⁸ Ibid., 146.

Table 1: Number of establishments and the distribution of employment in the Greek printing and publishing industry, 1958-1988

Year	1-9	10-49	50-99	50+	100+	Total
1958	1,203	165	23	—	9	1,400
1963	1,688	205	—	40	—	1,933
1969	2,026	203	17	—	22	2,268
1973	2,118	257	16	—	21	2,412
1978	2,561	246	19	—	22	2,848
1984	2,794	214	24	—	21	3,053
1988	3,468	298	22	—	21	3,809

The table above shows the number of printing businesses by size, i.e. the number of employees they engaged. Businesses employing between 1-9 workers form the majority in the period from 1958 to 1988. Figures taken from Simmons and Leandros, 'Printing and Publishing in Greece: "Flexibility" and the Process of Innovation, 1979-1991'. *Byzantine and Modern Greek Studies*, 20 (1996), 146.



Figure 2.1. Advertising for a business specialising in phototypesetting from the classified pages of *Η Τυπογραφία* (*The Typography*). This an example of one of a number of medium- to small-sized businesses carrying out one stage of the print production process. From *Η Τυπογραφία*, 31 March 1978, Issue 423, 22. 54% of original size.



Figure 2.2. Image accompanying the article 'Typography in the next 70 years' in *Η Τυπογραφία* (*The Typography*). The caption explains that women can comfortably operate phototypesetting machines, thus successfully replacing conventional male compositors — an identical point also made nine years prior to this article in a report from IPEX 63 featured in the arts magazine *Ζυγός* (*Zygos*). From *Η Τυπογραφία*, 1 January 1972, Issue 293-4, 12. 54% of original size.

lack of significant investment in research and development (R&D) further reduced the demand for printed matter.¹⁹

The combination of all these factors helped shape a small printing market that did not allow the emergence of many large printing units.²⁰ According to Simmons and Leandros, in 1958 the overwhelming majority of businesses in the printing and publishing industry employed fewer than 10 people. Although the number of large (100+ people) and medium-sized (10-49 people) printing businesses had increased significantly by 1969, there was no further growth in the years that followed. However, small businesses (1-9 people), whose numbers had also risen by 1969, kept increasing at a disproportionate rate until 1988 (table 1).²¹

Essentially, these figures point to a division of the Greek printing market into two distinctive parts. The few large printing businesses comprised one part, and concentrated exclusively on the publishing of national newspapers and magazines. Typically, they had the infrastructure to carry out all the stages of the print production process in-house, including typesetting, lithography, printing and binding. The other part included book publishing as well as the multitude of independent medium- and small-sized printing businesses.²² Most book publishers relied on the specialised services offered by the medium- to small-sized businesses which were differentiated by: the typographic work they undertook; the equipment and machines they used; the number of stages of the print production process they could accommodate on their premises; and the amount of staff they employed.²³ Therefore, in addition to the division of printing businesses based on their given size, there was also a fragmentation of services amongst medium- and small-sized printers as comparatively few of them were able to carry out all the stages of print production in-house (figure 2.1).

Regarding the adoption of new technologies, trade newspapers such as *Η Τυπογραφία* (*The Typography*)²⁴ diligently featured many articles that reported on the latest technological developments in printing, such as photocomposition, and their ramifications for the printing industry as a whole. In 1972, *Η Τυπογραφία* published an article whose title translates as ‘Typography in the next 70 years’ discussing at length the transformation of the printing process due to the increasing automation of tasks that the introduction of both photocomposition and computers in the printing process had enabled (figure 2.2). Moreover, it considered the challenges small, medium and large businesses faced, such as changes in working practices and the financial cost of new equipment, as they tried to adapt to the new circumstances (see 2.4).²⁵ The transformation of the printing process was evident as early as 1963 when the arts magazine *Ζυγός* (*Zygos*) published a report from the 11th IPEX

19 Leandros, Nikos, *Μαζικά έντυπα επικοινωνίας στην Ελλάδα. Οικονομικές και τεχνολογικές προσεγγίσεις* [Mass Communication Publications in Greece. Financial and Technological Approaches], (Athens: Delfini, 1992), 31.

20 Ibid.

21 Simmons and Leandros, 146.

22 Leandros, 34.

23 Zizopoulou, Athina, *Τυπογράφοι και εργάτες τύπου στην Αθήνα τον 20ό αιώνα: συγκρότηση και εξέλιξη ενός επαγγελματικού χώρου* [Typographers and press workers in twentieth-century Athens: formation and evolution of a professional field] unpublished PhD thesis, Department of History & Archaeology, University of Crete, 2006, 21.

24 *Η Τυπογραφία* (*The Typography*) started out in 1958 as a fortnightly newspaper (it is now monthly) covering issues related to the printing, graphics arts and paper industries in Greece. In particular, it covers a wide variety of industry topics, including domestic labour issues, printing technology and printing expositions, and typographic history.

25 ‘Η τυπογραφία κατά την τρέχουσα εβδομηκονταετία’, *Η Τυπογραφία*, Issue 293-4, 1 January 1972, 12.

trade exhibition²⁶ held in London that year discussing the rapid industrialisation of printing and its allied trades. The automation of typesetting, made possible by photocomposition, was represented by vividly describing a young woman operating the keyboard of a phototypesetter during a demonstration at IPEX. This image was then contrasted with the traditional craftsmanship and creative ability of compositors which, according to the report, was increasingly becoming a thing of the past. The report continued by discussing advances in other stages of the printing process, such as the operational speeds of printing presses, the reproduction of printing plates and the automation of folding and binding machines. It concluded by admitting that the industrialisation of the printing industry was inevitable during the postwar years when scientific and technological feats were taking place.²⁷

Nonetheless, the division based on the size of printing businesses meant that the adoption of new technologies, such as photocomposition, in the Greek printing industry was uneven. Large printing units — which included not only units focussing on newspaper publishing but also those of the National Printing Office, the Bank of Greece, the Ministry of Defence and the Greek Army — had the financial means to adapt more quickly to the changing circumstances that technological advancement brought.²⁸ But for many medium- to small-sized printing outfits, given the lack of financial support from the banks, the renewal of their equipment was not financially viable. For the most part, they undertook small-scale jobs with modest print runs which could be easily produced using manual or mechanical typesetting. These included not only the production of books, but also local newspapers, cards, invitations, stationery, small items of advertising and other ephemera. By undertaking this kind of work, medium- to small-sized businesses were able to make a living until the widespread use of photocomposition from the late 1970s onwards made their survival increasingly difficult (see 2.4).²⁹

2.2 Training, working conditions and the practice of typography

In the postwar years, there was no formal training for those who wished to enter the Greek printing industry. Despite a long campaign by the relevant trade unions and the Chamber of Commerce & Industry for the establishment of a national School of Typography, this never materialised.³⁰ Prior to this campaign, in 1952 the government had announced the founding of a School of Typography in Athens, which was affiliated with the National Printing Office (NPO) and used as a means of hiring future staff. The School offered a one-year training programme to a limited number of candidates in the use of Linotype and Monotype machines, typesetting, presswork and other specialisations pertaining to typographic work. After completing their training, students sat an examination. The successful candidates

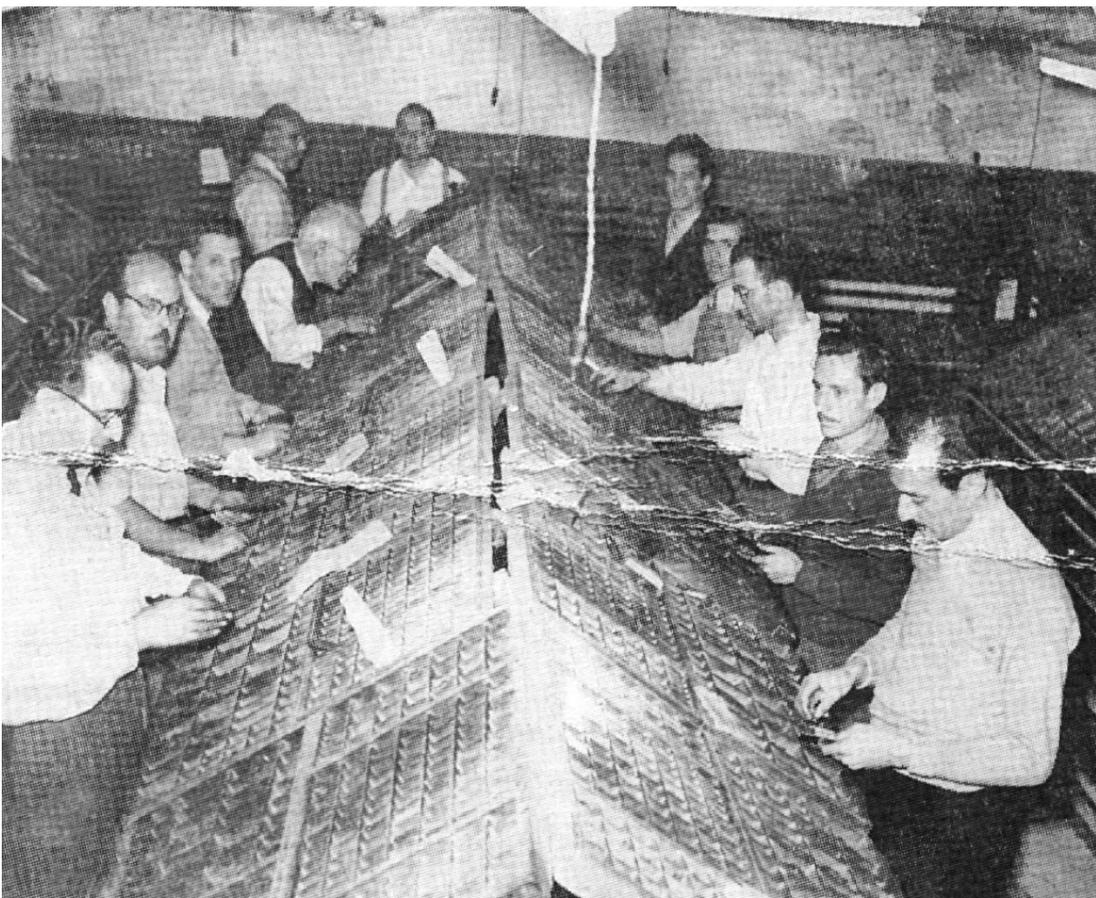
²⁶ The International Printing Machinery and Allied Trades Exhibition (IPEX), which takes place every four years, is the largest printing and graphic arts trade show in the English-speaking world.

²⁷ Safarikas, Manos, 'Η τυπογραφία εκβιομηχανίζεται. Συμπεράσματα απο μια Διεθνή Εκθεση' ['Typography is being industrialised. Conclusions from an International Trade Fair'], *Ζυγός*, 8.94-95 (1963), 42-44.

²⁸ Giannopoulos, Pyrrros, 'Τυπογραφία - Δημοσιογραφία' ['Typography - Journalism'], *Η Τυπογραφία*, Issue 57, 25 January 1961, 6.

²⁹ Mastoridis, Klimis, 'Καλλιτεχνικό τυπογραφείο. Σχέσεις αγάπης και μίσους με τα Ελληνικά στοιχειοχτήρια' ['Artistic printing shop. A relationship of love and hate with the Greek type foundries'], *ΗΥΦΕΝ*, 3.1 (2002), 22.

³⁰ The campaign was documented in articles in the trade newspaper *Η Τυπογραφία* between 1958 and 1976. For some of the most relevant articles, see issues 4 (1958), 54 (1960), 57 (1961), 75 (1961), 157 (1965), 167 (1966), 195 (1967), 201 (1967), 223 (1968), 242 (1969), 261 (1970) and 376 (1976).



Figures. 2.3 (top) and 2.4 (bottom). Greek compositors at work. Small- to medium-size printing businesses in postwar Athens were often to be found in unfavourable spaces such as poorly-lit basements. From *Μνήμων* 26, 2004. 100% of original size.

obtained an official certificate and, following a formal consultation, secured a permanent position at the NPO.³¹

In the absence of a national training framework, the graduates of the NPO's School of Typography did not only have job security, but were also regarded as better trained compared to apprentices who learned the trade on the shop floor.³² This latter kind of training lasted three years. By law, apprentices were not allowed to be younger than 16 years of age even though in practice this stipulation was not necessarily observed. Training ended when the apprentice turned 18.³³ Apprentices earned very little money, if any, and started out by performing menial tasks such as sweeping, carrying galleys of type to be printed, and running errands. In between these tasks, usually during lunch breaks or after the end of the working day, they learned how to use a composing stick to set lines of text, and to put metal type back in the cases. Learning any printing specialisation, and especially typesetting, depended to a great extent on the apprentice's individual effort. Due to the inherent job insecurity within the industry, apprentices were seen as future competitors, and older craftsmen were often unwilling to impart their knowledge to them.³⁴

Unlike those employed in newspaper publishing³⁵ or the NPO, a great number of pressmen, compositors and other skilled print workers did not enjoy job security. They often had to work as freelancers, hired on a job-by-job basis, as many printing businesses could not afford to keep the same staff for long periods of time. They moved wherever work could be found — from a variety of printing businesses to publishing houses — and worked long and irregular hours.³⁶ Some transcended this insecurity by setting up their own business. The initial capital for a venture like this often came in the form of savings, loans, an inheritance or a dowry. In order to keep costs down, these small business owners routinely set up shop in poorly-lit basements or otherwise unfavourable spaces (figures 2.3 and 2.4). The postwar upsurge in the number of small print shops meant that the competition to secure work was intense,³⁷ and their owners frequently had to work 10- to 14-hour days in order to earn a decent wage. On the other hand, having control over the means of production reinforced their feeling of independence and they could also call upon the help of their family when necessary.³⁸ There were also other, more covert, ways of securing additional income; for example, compositors often took on freelance work by hiring the space and equipment from other colleagues. Although this kind of arrangement meant many hours of

31 Voutsinakis, Evaggelos A., *Εθνικό Τυπογραφείο – Εφημερίς της Κυβερνήσεως, 170 χρόνια στην υπηρεσία του Ελληνικού κράτους* [National Printing Office – Government Gazette. 170 Years in the Service of the Greek State], (Athens and Komotini: Ant. N. Sakkoulas Publishers, 2005), 213-216.

32 Ibid.

33 Zizopoulou, 45-47. According to Zizopoulou, although legislation in 1943 prohibited minors under 16 years of age from working in printing shops, this was never enforced. Moreover, she states that individual national insurance files showed that a large number of minors completed their apprenticeship between the ages of 14 and 17.

34 Loukos, Christos, 'Ένας τυπογράφος στην Αθήνα του 20ού Αιώνα. Προσωπικές και επαγγελματικές διαδρομές', [*A typographer in twentieth-century Athens. Personal and professional journeys*] *Μνήμων* 26 (2004), 242.

35 Press workers employed in national newspapers were represented by their own trade union (Athens Association of Press Workers), which had been influential in imposing pre-entry closed-shop arrangements. Thus, it ensured absolute control over the supply of labour and guaranteed higher wages for their union members than those print workers working elsewhere in the printing industry. See Simmons and Leandros, 150-151.

36 Loukos, Christos, 'Τυπογραφία και τυπογράφοι στο Ελληνικό κράτος' [*Typography and typographers in the Greek state. First approximation: Athens 1930-1990*], *Μνήμων* 24 (2002), 310-313.

37 Mitsopoulos, Nikos, 'Στοιχειοχτήρια και στοιχεία' [*Type foundries and types*], *Η Τυπογραφία*, Issue 31-32, 10 January 1960, 4.

38 Ibid, 312-313.

intense personal work, profit was derived from not having to pay tax or national insurance contributions.³⁹

Some printers and typographers felt that the apparent growth in the number of printing businesses was detrimental to the quality of the printed output. The printer and publisher I. M. Skazikis felt that the working conditions in small printing shops were substandard, and that compositors worked with few type cases at their disposal — an issue that was connected to the variety of Greek typefaces in the printing market (see 2.3). At the same time, the intense competition to secure work led to an often dramatic lowering of price estimates, whilst the clients' indifference or inability to discern good quality work seriously affected all stages of print production.⁴⁰ For E. Valasakis, who owned a business producing advertising brochures, the time allocated for working out the typographic layout as well as the number of dummies produced was paramount for ensuring the quality of the end product. Additionally, quality materials as well as the skills of good craftsmen also needed to be factored into the job estimates, and cutting corners could only be detrimental to 'the aesthetic and artistic appearance of a printed job'.⁴¹ Both Skazikis and Valasakis pointed out that the lack of aesthetic and technical training of many craftsmen had a direct impact on the typesetting, pagination and printing of jobs, and did not allow them to achieve the best possible results. Moreover, both made comparisons with the typographic quality evidenced on printed matter that was produced abroad: Skazikis's opinion was that many years were needed before Greek typography could reach the kind of quality other countries had already achieved by the beginning of the twentieth century;⁴² Valasakis thought that Greek brochures were unique in shoddy workmanship, bad taste and especially bad printing, and that they looked unsophisticated compared to foreign ones.⁴³ In recollecting the working practices of the postwar years, the engraver and type designer Takis Katsoulidis also pointed out that the lack of appropriate training was a fundamental impediment in raising typographic standards; in his opinion, the fact that compositors and printers alike had no aesthetic values with which to discern a well-designed typeface from a poor one was detrimental to the work they produced.⁴⁴

The overall picture of the printing and publishing industry in Greece was one of division and fragmentation. Its two constituent parts concentrated on different activities: the few printing units large enough to carry out all the stages of print production concentrated on newspaper publishing; the multitude of medium- to small-sized businesses provided a variety of services to book publishers and other clients, depending on the equipment they had at their disposal. The lack of a formal training framework, the job insecurity and the often poor working conditions for a large part of the industry had an adverse effect on the general quality of the work produced. Given the increasing automation of the printing process, only large printing units were in a position to adjust to the changing circumstances that postwar technological advances brought. A large number of businesses

³⁹ Ibid, 313.

⁴⁰ Skazikis, I. M., 'Η τυπογραφία στην Ελλάδα' ['Typography in Greece'], *Ζητός*, 2.22-23 (1957), 5.

⁴¹ Valasakis, E., 'Γιατί τα Ελληνικά έντυπα είναι τόσο κακής ποιότητας;' ['Why are Greek publications of such poor quality?'], *Η Τυπογραφία*, Issue 49, 25 October 1960, 6.

⁴² Skazikis, 4.

⁴³ Valasakis, 4.

⁴⁴ Katsoulidis, Takis, personal interview, Athens, Greece, 13 July 2017.

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 αβγδεζηθθικλμνξοπρστυφφχψωσ

Figure 2.5. Monotype's Series 90 (top) and 91 (bottom) were well-established typographic styles in postwar Greek typography. The upright style is in line with the Greek Didot whilst the inclined style is influenced by styles available from German type foundries. From 'A primer of Greek Type Design'. *Language, Culture, Type. International Type Design in the Age of Unicode*, 2000, 84. 100% of original size.

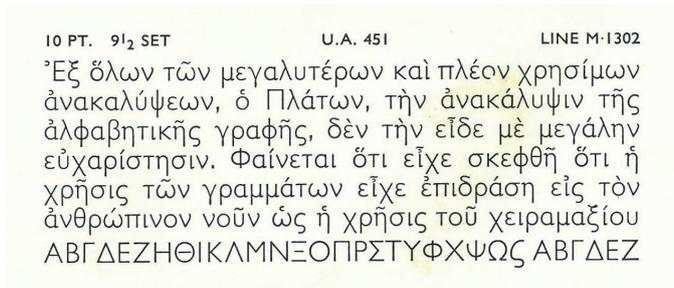


Figure 2.6. Example of Monotype's Gill Sans Greek Light Upright. It became available for text setting in the 1950s, and was used extensively in magazines and in advertising. From *Specimen Book of Monotype Non-Latin Faces*. Undated, DTGC. 110% of original size.



Figure 2.7. Type specimen of the 'Niki' (Victory) display typeface from the mid-1950s. It was available from the PAP type foundry, one of many Greek display typefaces commissioned by the local type foundries from local graphic artists. From *HYΦΕΝ*, 1.4, 2002. 52.7% of original size.

still relied on traditional craftsmanship and machinery, which was adequate for producing the kind of jobs they undertook.

2.3 The variety and quality of Greek typefaces

In the postwar period there were approximately four type foundries providing printing businesses with typefaces throughout Greece. Their main concern was to manufacture and supply types from matrices bought from foreign type manufacturers, as well as import and sell materials, machines and furniture for printing businesses. The manufacture of typefaces had always been a highly specialised skill requiring expensive equipment as well as technical knowledge of casting. Foreign type manufacturers were a closed shop, and the ownership of original type designs and matrices were considered a valuable business asset. As Greece did not have a tradition in type design and the local type foundries had no means of competing with foreign technical expertise, Greek typefaces had always been the sole preserve of foreign type manufacturers.⁴⁵ The models that text faces were based on had already been established through the influence of the Monotype and Linotype companies. Some of these included Monotype's series 90 and 91 (figure 2.5), Times Greek and, from the 1950s onwards, Gill Sans (figure 2.6) which was used extensively in the periodical press and advertising. Compared to Greek text faces, there was a relative profusion of Greek display typefaces as these were commissioned by the foundries from local graphic artists for use in newspapers and in advertising (figure 2.7).⁴⁶ Fewer attempts, if any, were made to design typefaces for continuous text.⁴⁷

Almost all printing businesses used the text faces designed by the international type manufacturers and supplied by the local type foundries.⁴⁸ This shortfall had repercussions in the quality of the typographic work produced. Once again, the printer I. M. Skazikis wrote:

There isn't a great variety in Greek typefaces, and few of the existing ones fulfill the aesthetic demands of every job. [...] the cutting of Greek types was assumed almost exclusively by foreigners, who were inevitably influenced by the character of the Latin alphabet. Whereas if Greek artists had been seriously involved in this field of graphic arts, a tradition would have been established, as well as stylistic variety and quality. This deficiency is particularly noticeable every time we want to typeset a beautiful book cover with appropriate typefaces: most of the time we have to resort to designing the titles from scratch and use zincography in order to reproduce them.⁴⁹

⁴⁵ Mastoridis, Klimis, 'Cutting and casting Greek types in the nineteenth and twentieth century', *Gutenberg Jahrbuch 2006*, 319-321.

⁴⁶ Efstathiadis, Giannis, 'Περίβλεπτοι Διόσκουροι μιας Τέχνης ταπεινής' ['Prominent Dioscuri of a humble Art'], in *Διαδρομές/ Design Routes*, by Carabott, Freddie; Katzourakis, Michalis and Katzouraki, Agni, (Athens: Hellenic Literary and Historical Archive 2008), 248. According to Efstathiadis, the postwar Greek graphic design scene was an eclectic mix of lithographers and zincographers coexisting with painters and folk artists, soon to be joined by graphic designers. For references to the collaborations between graphic artists and Greek type foundries, see Mastoridis, Klimis, 'Μια συζήτηση με τον Σταύρο Βενέτη το καλοκαίρι του '90' ['A conversation with Stavros Venetis in the summer of '90'], *HYΦEN*, 3.1 (2001), 39.

⁴⁷ Leonidas, Gerry, 'A primer on greek type design', in *Language, Culture, Type. International Type Design in the Age of Unicode*, ed. by John D. Berry (New York: ATypI Graphis, 2002), 83-85.

⁴⁸ Katsoulidis, personal interview, 13 July 2017.

⁴⁹ Skazikis, 5. Author's translation.

The type designer Takis Katsoulidis, who taught classes in drawing letterforms at the Doxiadis School⁵⁰ in the 1960s and 1970s, concurred that there was a distinctive lack of typefaces that could be used for continuous text, adding that those that were available were unremarkable. He recalled that his students, during the course of a set project, often created Greek letterforms by splicing and joining Latin characters from Letraset sheets. When he asked them the reason for this practice, they invariably replied that the shapes of Latin characters were better, in terms of their design, than the available Greek ones.⁵¹ The graphic designer Sophia Zarabouka, who was responsible for the design of the corporate literature at Doxiadis Associates (see chapter 5), felt that the Greek typefaces she used for the typesetting of biligual publications were not as sensitively designed as Latin ones. She especially found the Greek lowercase letterforms unsatisfactory; in order to reduce what she anticipated would be a negative comparison of the Greek compared to the Latin letterforms, she often typeset them on separate pages.⁵²

Moreover, the durability of the typefaces was often poor. In the early 1950s, Greek type foundries routinely melted down and recast old metal, using old matrices and equipment. This was largely the result of a government policy that prohibited metal imports due to currency exchange restrictions. The process of recasting spoiled the composition of the alloy as specified by the international standards for printing types, and created metal typefaces with a disproportionately large percentage of lead against significantly reduced proportions of copper and tin. Consequently, the types produced had imperfections and were easily worn out. Printers were then forced to replace their stock more often than once every five years, resulting in considerable expenditure for them.⁵³ The printer Nikos Mitsopoulos attested to their poor quality in an article he wrote for *Η Τυπογραφία* (*The Typography*) in 1960:

[...] I emphasise that the quality of typefaces is dismal regarding durability and in terms of their proportions [...] after a small amount of press usage it is impossible to use them again for printing jobs that need to be satisfactory at the very least.⁵⁴

Neither the variety nor the durability of typefaces improved even with the generous loans that some type foundries received under the Marshall Plan. It appears that the much needed cash did not provide them with the necessary impetus to renew their equipment, increase their production or improve the overall quality of typefaces to a degree that would help ameliorate the existing situation.⁵⁵ Those who were unable to replenish their stock often resorted to the illegal practice of copying foreign-made matrices by using electrotyping. Therefore, from an initial purchase of limited characters they created new matrices for

50 Founded by the internationally renowned urban planner Constantinos Doxiadis (see chapter 4), the Athens Technological Institute was part of the Doxiadis Organization. It was more widely known as the Doxiadis School and provided a high level of education for many design disciplines such as graphic design, technical drawing, interior decoration, conservation, etc. The highly-regarded qualifications gained at the School secured graduates access to the Greek labour market.

51 Katsoulidis, personal interview, 13 July 2017.

52 Zarabouka, Sophia, personal interview, Athens, Greece, 27 May 2017.

53 Mastoridis, 'Cutting and casting Greek types in the nineteenth and twentieth century', 330-332.

54 Mitsopoulos, 4. Author's translation.

55 Constantinidis, Fanis, 'Είμεθα δυσαρεστημένοι με τα στοιχειοχυτήρια' ['We are dissatisfied with the type foundries'], *Η Τυπογραφία*, Issue 143, 1 February 1965, 7. The article was originally published in 1950 in the trade newspaper *Η Τυπογραφία*, and reprinted in 1965.

multiple reproduction.⁵⁶ To highlight the type foundries' dubious practice of recasting and its effects on the durability of typefaces, the typographer Nikos Damianos wrote that:

[...] before 1933, printing types used to last from five to six years depending on their maintenance. This is ascertained by all old colleagues. However, we all see today that we have to renew our types every now and then, if we wish to produce nice jobs. This happens because it was not easy to import type from abroad due to exchange restrictions etc. Thus, domestic foundries were left free without competition, and for reasons of profiteering spoiled the composition of the metal with malicious calculation, manipulating our inexperience and need for immediate replacement of our types.⁵⁷

Damianos claimed that it was in the foundries' financial interest to retain the poor quality of the typefaces in order to force printing businesses to replenish their stock more often than they needed to. Moreover, he implied that printers' ignorance of the chemical properties of printing metals worked to the foundries' advantage in order to avoid their protestations. To prove his point, Damianos went as far as conducting his own chemical analysis by providing two comparative tables showing the alloy used by types for Monotype composition against the alloy composition of types produced domestically. These were as follows:⁵⁸

Monotype composition types		Domestic production types	
Antimony	25.00%	Antimony	24.61%
Tin	12.00%	Tin	4.75%
Copper	8.00%	Traces of copper	00.60%
Lead	55.00%	Lead	70.04%
Total	100.00%	Total	100.00%

According to Damianos's analysis, the domestic foundry types had an excess of lead which, although a malleable and ductile metal, is nonetheless soft and weak. The percentage of antimony is also lower than expected; although alloy composition can vary, *Fry's Printing Metals* recommends at least 25% of antimony to 14% of tin. Increases in antimony require analogous increases in the proportion of tin in order to substantially improve the hardness and durability of types. The introduction of copper in the alloy further contributes to the hardness and resistance of types, and the amount that can be safely added in the alloy depends on the tin and antimony contents; for example, with 10% tin and 24% antimony, 0.5% of copper is recommended.⁵⁹ Therefore, in order to be durable, types for handsetting need an alloy rich in tin and antimony, and include a small percentage of copper.

The lack of variety and quality of typefaces supplied by the type foundries created additional problems for printing businesses. Given that many printing outfits undertook small-scale typographic work, it followed that the nature of this work also dictated the type sizes used: for example, 10 to 12 point types as well as display faces for small pieces of

⁵⁶ Mastoridis, 'Cutting and casting Greek types in the nineteenth and twentieth century', 321.

⁵⁷ Damianos, Nikos, 'Τα τυπογραφικά στοιχεία και οι βιοτέχνες τυπογράφοι' ['Metal types and jobbing printers'], *Η Τυπογραφία*, Issue 143, 1 February 1965, 7. The article was originally published in 1950 in the trade newspaper *Η Τυπογραφία*, and reprinted in 1965. Author's translation.

⁵⁸ Ibid.

⁵⁹ *Fry's Printing Metals*, (London: Fry's Metal Foundries Ltd., 1966), 42-43.

advertising, and 8, 9 and 10 point sizes for text-heavy jobs, such as textbooks.⁶⁰ Therefore, notwithstanding the additional expenses of replacing poor quality type, the lack of a variety of typefaces, especially for continuous text, had a detrimental effect on the quality of typographic output. This ongoing issue in the Greek printing industry created a demand for good quality, well-designed and durable typefaces, and paved the way for the international type manufacturer Linotype to embark on the design of Caledonia Greek, a new Greek text face for hot-metal newspaper composition (see chapter 3).

2.4 The impact of photocomposition

Photocomposition represented a fundamental departure from the printing practices that letterpress had established for 500 years; characters relinquished their metal body and were stored initially in photographically-produced matrices and subsequently on film strips. Consequently, filmsetting foreshadowed the end of printing using metal types, and, although its dominance was brief, it transformed the printing industry by forcing it to radically adapt to new techniques and conventions. The wave of postwar technical innovation⁶¹ enabled photocomposition's commercial viability, and from the late 1960s onwards photocomposition systems witnessed a considerable boom. In 1968, the launch of a series of low-cost phototypesetters by the Compugraphic Corporation offering automatic word hyphenation and line justification was a significant contribution to this upsurge.⁶² Such affordable machines were quickly welcomed by small commercial typesetting outfits, magazines as well as in-plant publishers and printers worldwide, thus helping to popularise the new process.⁶³ Compugraphic's efforts were quickly followed by competing companies putting out a substantial number of phototypesetting systems, ranging from powerful machines to relatively simple ones, in the international printing market.⁶⁴

The benefits of photocomposition were significant: it was compatible with offset-litho printing; after the first phase of photomechanical devices, the input of text by means of electronic keyboards increased, therefore the volume of work that could be handled grew larger; computerised editing allowed text corrections to be made quickly; and a number of electronic features allowed for fresh manipulation of type, such as slanting. As they became more advanced, phototypesetters utilised technology to improve hyphenation and justification, automate kerning, page makeup and typographic formatting in order to lay down entire pages with text and images.⁶⁵ Their flexibility enabled printers to take on more complicated print work, and by the end of the 1970s photocomposition had become the prevailing method of typesetting throughout the western world. The number of system

60 Mastoridis, 'Καλλιτεχνικό τυπογραφείο. Σχέσεις αγάπης και μίσους με τα Ελληνικά στοιχειοχτήρια' ['Artistic printing shop. A relationship of love and hate with the Greek type foundries'], 22.

61 In particular, third-generation phototypesetters incorporated electronics in their setup. Crucially, they exposed type not from a photographic master but electronically as a series of dot patterns or strokes on the face of a cathode ray tube (CRT). CRT machines eventually paved the way towards digital phototypesetters. See Seybold, John W., *The World of Digital Typesetting*, (USA: Seybold Publications, 1984), 112-113.

62 Wallis, Lawrence W., *Typomania, Selected Essays on Typesetting and Related Subjects*, (Worcestershire: Severnside Printers Limited, 1993), 50-51.

63 Norton, Robert, 'Phototypesetting: Buyer Know Thyself', in *Penrose Annual*, Vol. 69, ed. by Stanley Greenwood and Clive Goodacre, (London: Northwood Publications Ltd., 1976), 119.

64 Wallis, Lawrence W., 'The Phototypesetting Jungle', in *Penrose Annual*, Vol. 63, ed. by Herbert Spencer, (London: Lund Humphries Publishers Limited, 1970), 213.

65 Seybold, 137-138.

installations in Britain alone is indicative; there were 230 in 1970 rising to 420 in 1972. By 1993 more than 10,000 systems were in use.⁶⁶

In Greece, the adoption of photocomposition was slow compared to the American and western European printing markets, and to begin with installations were few.⁶⁷ In the early 1970s, few printing businesses would have been able to make the costly transition occasioned by replacing old machinery with new typesetters and keyboards. As has been shown, the profusion of small printing businesses in the Greek printing industry prohibited changes on such a large scale (see 2.1). In order to make this technological shift, businesses would have needed: substantial financial means; an infrastructure that could accommodate all stages of the printing process; and a printing output sufficiently large. Although there was potential for a more extensive use of photocomposition in the nascent Greek printing market, the reality was that the majority of printing businesses were still employing hot-metal composition. Costas Makris, an engineer responsible for the successful development of Fototronic's TxT phototypesetter,⁶⁸ returned to Greece in 1973 to set up OrthoData Ellas Ltd. The aim of his company was 'to buy, sell and support computers, computer systems and peripherals particularly in the minicomputer hardware system area'.⁶⁹ In a letter to Mike Parker, Director of Typographic Development at the Mergenthaler Linotype Company in New York, he described the situation he witnessed first-hand:

The market research that I conducted last summer in Greece revealed that [Greece] with its phenomenal economic growth is open to minicomputer systems and applications. [...] I also have noticed that in the printing field, except for a very few installations, hot metal is still in use. Without a doubt in the near future, hot metal will be substituted by phototypesetting in this country as it happened in the States and it is happening in central Europe. [...] I believe the market here for phototypesetting machines and updated input editing systems is open.⁷⁰

The financial and political situation in the country were additional factors working against the adoption of photocomposition on a wider scale. In 1967 a successful military coup had established a dictatorship. The new regime had banned a number of national newspapers and magazines while others were forced to close down. The imposition of an extortionate import duty on newsprint for average daily circulations of 25,000 copies and above drove some of the remaining newspapers out of business.⁷¹ Although there was demand for print, by the time the regime collapsed in 1974 only six national newspapers were in circulation.⁷²

The restoration of democracy in 1974 brought a general sense of optimism and a drive towards progress, and led to the development of mass consumerism, mass production and mass communications in Greek society. There was now scope for more advertising, direct marketing and publications of all kinds prompting the expansion of offset lithography as a

⁶⁶ Ibid.

⁶⁷ Leandros, 162.

⁶⁸ Mike Parker to Tage Bolander, 26 November 1973. Label V-I-P Products, File V-I-P Greek PF24-3/Products (Old)/Technical, Box 1, NMAH.

⁶⁹ Costas Makris to Mike Parker, 21 September 1973. Label V-I-P Products, File V-I-P Greek PF24-3/Products (Old)/Technical, Box 1, NMAH.

⁷⁰ Ibid.

⁷¹ Vlachos, Helen, 'The colonels and the press', in *Greece Under Military Rule*, ed. by Richard Clogg and George Yannopoulos, (London: Secker & Warburg, 1972), 69.

⁷² McDonald, Robert, *Pillar and Tinderbox. The Greek Press and the Dictatorship*, (New York and London: Marion Boyars, 1983), 180.

Η εφημερίδα «ΑΠΟΓΕΥΜΑΤΙΝΗ»
πέρασε στη Νέα Τεχνολογία

**ΟΛΟΣ Ο ΜΗΧΑΝΙΚΟΣ ΤΗΣ ΕΞΟΠΛΙΣΜΟΣ
ΠΩΛΟΥΝΤΑΙ**

Λινοτυπίες (Ιντερτάιπ, Λινοτάιπ, ΤΕΤΡΑΠΛΕΣ, μοντέ-
λο 31 και 78, βρίσκονται σε άριστη κατάσταση και σε ΤΙ-
ΜΕΣ ΑΠΙΣΤΕΥΤΕΣ.

Επίσης μύτρες ΚΑΙΝΟΥΡΓΙΕΣ και μεταχειρισμένες.
Στοιχεία μεταχειρισμένα (χωρίς όμως να έχουν περάσει
από πρέσσα. Μέταλλο λινοτυπίας, κομά μεταλλικά, πάγκοι,
μάρμαρα.

Και κόφτρες αράδων λινοτυπίας, καζάνια τήξεως με-
τάλλου. ΜΕΤΑΛΛΑ ΑΝΥΨΩΣΗΣ και μηχανή ΝΕΜΠΙΤΑΪΤ.

Για κάθε πληροφορία τηλεφωνείστε: 36.18.811, εσωτ.
148 από 9—2 μ.μ. ή 63.13.470 και 65.13.470 από ώρα 3—10 μ.μ.

ΜΗ ΧΑΣΕΤΕ ΤΗΝ ΕΥΚΑΙΡΙΑ

Figure 2.8. Advertising by the national daily *Απογευματινή* (*Apogevmatini*) in *Η Τυπογραφία* (*The Typography*) in 1986. The newspaper, having switched to photocomposition, is announcing the sale of its old equipment, including Linotype and Intertype machines, new and used matrices, and used hot-metal types. By 1987, all national newspapers had made the transition to photocomposition. From *Η Τυπογραφία*, 15 December 1983, Issue 579, 3. 20% of original size.

printing process and the increasing use of photocomposition for the faster and more flexible setting of text.⁷³ The decisive moment for the widespread use of photocomposition came in the early 1980s when many national newspapers restructured and, in the process, replaced their old equipment with photocomposition systems. The daily *Ethnos* (*Ethnos*) is a noteworthy case: relaunched on 14 September 1981, it became the first national newspaper to be produced using electronic phototypesetting and printed onto an offset litho press.⁷⁴ Photocomposition inaugurated a level of automation that had not previously been possible in the production of newspapers. As Seybold states ‘stories could be routed from director to editor, composed within the system so that copy fitting could be performed, and then sent along to the typesetting machine for final (usually galley) output’.⁷⁵ Other national newspapers, such as *Ελευθεροτυπία* (*Eleftherotypia*) and *Μεσημβρινή* (*Mesimvriini*), followed suit in the summer of 1982, and by 1987 all 16 national newspapers had made the transition to photocomposition (figure 2.8).⁷⁶ By then, the National Printing Office had also begun incorporating electronic typesetting in its production process.⁷⁷

As phototypesetting became faster and increasingly cheaper than mechanical typesetting it started making headway in book publishing. Long-standing businesses offering hand composition, Monotype or Linotype text setting were unable to adjust to the new circumstances and struggled financially. By the end of the 1970s, many had closed down. Those that survived managed to do so by phasing out handsetting and disposing of the inferior foundry typefaces. As there was still demand in some sections of Greek book publishing for mechanical typesetting, they invested in Monotype systems which automatically cast and set brand new and perfectly spaced lines of text.⁷⁸ This resurgence in conventional Monotype composition was not enough to stop neither the plight of many well-established businesses nor the widespread use of photocomposition. The implications of these new circumstances favoured international type manufactureres such as Mergenthaler Linotype. For some time, the company had been counting on the renewed optimism and drive of the Greek printing industry after the restoration of democracy. Since 1970, the company had been making a sustained effort in establishing their phototypesetters in the Greek printing market (see chapters 4 and 5). The expansion of photocomposition came at a time when Linotype had already embarked on a long-term programme of Greek typeface development especially for photocompostion, which was designed to give their phototypesetters a competitive edge in the nascent Greek photocomposition market, and increase their sales (see chapter 6).

2.5 Conclusion

Despite the growth of the Greek economy in the postwar years, long-term structural problems impeded the development of the printing and publishing industry. One of the

⁷³ Nicholas, Maria, ‘A brief history of modern Greek advertising, 1950-1999’, *HYΦEN*, 3.2 (2002), 22-23.

⁷⁴ Leandros, 160-161.

⁷⁵ Seybold, 360.

⁷⁶ Simmons and Leandros, 153.

⁷⁷ Voutsinakis, 289-290.

⁷⁸ Sklavenitis, Triantafyllos E., ‘Ο Χρίστος Μανουσαρίδης (1936-2008) και η εκδοτική άνοξη της Μεταπολίτευσης στο λυκόφως της μηχανικής στοιχειοθεσίας και της μεταλλοτυπίας’ [‘Christos Manousaridis (1936-2008) and the publishing resurgence during Metapolitefsi at the twilight of mechanical composition and metal type’], in *Τυπογραφία και τυπογράφοι. Πρακτικά ημερίδας στη μνήμη του τυπογράφου Χρίστου Γ. Μανουσαρίδη* [Typography and typographers. Minutes from a workshop in memory of the typographer Christos G. Manousaridis], ed. by Giannis Kokkonas, (Athens: EMNE - Περιοδικό Μνήμων, 2013), 37-45.

major factors at work was the absence of incentives and financial support towards the modernisation of its technological infrastructure. This created to a large extent a limited printing market made up of two constituent parts. Therefore, the general picture of the printing and publishing industry in Greece was one of division. Few large units emerged that could accommodate all the stages of the printing process, and those that did exist concentrated on newspaper publishing. In order to accommodate this shortage of large printing units, a great number of medium- to small-sized printing businesses proliferated. Depending on the equipment at their disposal and the size of their premises, they offered a variety of typographic work as well as one or more print production stages. This situation led to a fragmentation of services within the industry whereby in order for a job to be completed more than one printing business was engaged.

The lack of a formal training framework for apprentices created yet another division between the few who had obtained the highly sought-after qualifications from the NPO's School of Typography and those in the majority who had learned the trade on the shop floor. The lack of a national training framework for print workers was also a fundamental impediment in raising typographic standards as craftsmen were not equipped with the necessary knowledge to discern good typefaces from poor ones. The typographic output was also affected by the lack of variety and the inferior quality of the typefaces that the local type foundries supplied. In particular, for those printing businesses whose output was small-scale and with modest print runs, the additional expenditure to replace imperfect type regularly and the lack of variety of typefaces, especially for continuous text, added to the difficulties they faced in order to produce satisfactory work. In turn, this ongoing issue created a demand for well-designed, good quality and durable typefaces, and paved the way for the design of Caledonia Greek by the international type manufacturer Linotype.

Finally, the adoption of new technologies, such as photocomposition, in the Greek printing industry was uneven. When the rapid developments in printing technology arrived during the postwar years, the large printing outfits were able to adjust more quickly to the changing circumstances these advancements brought. In particular, the widespread adoption of photocomposition happened relatively later than in other printing markets in Europe and the U.S., but reached a critical point in the 1980s when it became the primary means of production for all national newspapers in Greece. The drawback of this transition was the closing down, with few exceptions, of many of the medium- and small-sized businesses that made up a large part of the printing industry. However, the shift to photocomposition suited Linotype in its effort to establish their phototypesetters in the nascent Greek photocomposition market. The company's long-term programme of Greek typeface development was designed to give its phototypesetters the necessary competitive edge in order to increase their sales.

The next chapter examines the design of Caledonia Greek, whose development lasted from 1963 until 1970, at a time when Linotype's focus had yet to shift towards the nascent Greek photocomposition market. The typeface was intended for newspaper composition in an effort by Linotype to address the lack of variety and quality of Greek typefaces for hot-metal, and to compete more effectively in matrix sales with Intertype in the Greek printing trade. Although Caledonia Greek was initially aimed at the hot-metal market, it was also available for photocomposition from 1970 onwards. As such, it is a precursor of the Greek typefaces for photocomposition that Linotype made available in the 1970s (see chapters 5 and 6).

3 Transitioning from hot-metal to photocomposition: the design of Caledonia Greek

This chapter examines why Linotype chose to adapt the Latin Caledonia for Greek, and its design process. Typefaces were a valuable asset for every type composing machine manufacturer as they enhanced the value and sales of their typesetters. Their development, done in-house as well as in collaboration with renowned type designers, was expensive as well as time consuming. In this context, section 3.1 gives a short survey of the history of Linotype, its company structure, and the importance of its typeface library to highlight the central role type design played in the promotion and selling of its type composing machines, whether for hot-metal or photocomposition, in a given printing market. Section 3.2 examines Linotype's development of Caledonia Greek in order to address two issues: firstly, the lack of quality and variety of typefaces in the Greek printing trade; and secondly, the competition for newspaper matrix sales with the rival type manufacturer Intertype. It does so by using archival evidence extensively, and gives emphasis to the typeface's long design process. Although Caledonia Greek was initially aimed at the newspaper hot-metal market in Greece, it was subsequently adapted for photocomposition in 1970. In that sense, it foreshadows the programme of Greek type design for photocomposition Linotype embarked on throughout the 1970s. Section 3.3 provides an evaluation of the typeface, followed by the conclusion to the chapter.

3.1 The Linotype Group of Companies

Linotype had a long tradition not only in the manufacture of typesetting equipment, but also in the design of high-quality typefaces. The company was founded in 1886 in New York as the Mergenthaler Linotype Company (MLCo) in order to promote the Linotype machine. The machine was quickly adopted in newspaper publishing, as well as in general printing, and its success initiated the emergence of the typesetter industry.

The company's success also prompted its expansion internationally, and included the affiliated Linotype & Machinery (L&M) in the U.K., and Mergenthaler-Linotype GmbH in Germany.⁸¹ Moreover, Linotype established agencies and employed representatives or agents around the world in order to promote its products internationally. The role of the representatives was essential for Linotype. They had an understanding of local markets and the workings of their printing industries; as is shown in 3.2 and 3.3, Linotype's Greek representative Costas Chrysochoides had a decisive role not only in the initiation of the design of Caledonia Greek but also during its development. Representatives also developed strong sales networks with key customers such as newspapers, magazines, advertisers, publishers, typographers and commercial printers, and acted as the intermediaries between them and the Linotype companies in Europe and the U.S.⁸² Furthermore, agents were relied

81 Wallis, Lawrence W., *A Concise Chronology of Typesetting Developments, 1886-1986*, (London: The Wynkyn De Word Society, 1988), 4-7.

82 Tripsas, Mary, 'Surviving Radical Technological Change Through Dynamic Capability: Evidence from the Typesetter Industry'. *Industrial and Corporate Change*, 6.2, (1997), 351.

upon to recognise commercial opportunities in the printing markets for which they were responsible. The information they provided enabled Linotype to: develop its research and development (R&D); improve the function of its machines; develop new typefaces; and expand its international market share in sales.

From the outset, Linotype invested heavily in typeface development. In the typesetting industry the size of a manufacturer's type library directly affected the value and sales of its typesetting machines, and for prospective buyers in advertising, commercial printing and book, magazine and newspaper publishing it was one of the most critical purchase criteria. Linotype had in-house letterdrawing departments across all three affiliated companies, and was very efficient at hot-metal development with strong routines and fine-tuned procedures.⁸³ It was also a significant shareholder in European type foundries, such as Stempel, which meant that it could license typefaces from their extensive type collections. Gradually, these resources allowed Linotype to establish a type library which was, arguably, one of the most comprehensive in the industry.⁸⁴ Moreover, it was one of its most valuable and enduring assets which significantly supported machine sales.⁸⁵

The postwar proliferation of photocomposition compelled Linotype to invest a substantial amount of research and development in a number of phototypesetting machines in an effort to expand its market, which had traditionally been the newspaper industry, to general printing and advertising fields. At the same time, the company began the conversion of its type library from hot-metal to photocomposition. From 1963 until 1981, Mike Parker, Director of Typeface Development at the Mergenthaler Linotype Company,⁸⁶ presided over an ambitious programme of typeface development requiring a considerable and multifaceted amount of work in order to create an inclusive library of type designs for full-page setting. More specifically, it involved: the redrawing of older type styles in order to suit the conditions imposed by phototypesetting and offset lithographic printing; the expansion of long-standing type families; the licensing and production of typefaces by other type manufacturers or foundries; and the commissioning of new type families from type designers such as Hermann Zapf, Adrian Frutiger and Matthew Carter.⁸⁷ The conversion of Linotype's type library from hot-metal to photocomposition as well as its significant expansion with new type designs, both Latin and non-Latin, was crucial for the company in order to support the sales of the phototypesetters in new printing markets, such as the Greek one. Linotype's development of Greek typefaces specifically for photocomposition is discussed in chapters 5 and 6.

3.2 The design of Caledonia Greek

Caledonia Greek was a typeface that was developed for hot-metal and was later adapted for photocomposition. It was a text face for newspaper composition, and its development began in 1961 — just before Linotype began the conversion of its type library from hot-metal to photocomposition at a time when the newspaper industry was the company's core market.

⁸³ Tripsas, Mary, 'Unravelling the Process of Creative Destruction: Complementary Assets and Incumbent Survival in the Typesetter Industry', *Strategic Management Journal*, Vol. 18 (1997), 128.

⁸⁴ Wallis, Lawrence W., *Type Design Developments, 1970 to 1985*, (Arlington: National Composition Association, 1985), 75.

⁸⁵ *Ibid.*, 128.

⁸⁶ For biographical information, see Appendix B.

⁸⁷ Wallis, *Type Design Developments, 1970 to 1985*, 76. For biographical information on Matthew Carter, see Appendix B.

Caledonia Greek was Linotype's effort to address two interrelated issues: firstly, the lack of quality and variety of typefaces in the Greek printing trade; and secondly, the competition for matrix sales with the type manufacturer Intertype.⁸⁸ Both these issues formed part of the commercial considerations that underpinned the design of typefaces: not only did they equip Linotype machines but also supported their sales. Intertype, Linotype's major competitor in Greece, provided cheaper hot-metal matrices and a faster delivery than Linotype. Moreover, the Intertype composing system had interchangeable matrices with the Linotype — thus giving access to Linotype's extensive type library — which meant that Intertype matrices could also be used in Linotype machines. In a letter to Ralph Goodman, Export Sales Manager for L&M, Costas Pophaides, the Linotype agent in Cyprus, explained the implications of this facility with regard to Linotype's matrix sales:

It is a fact that as soon as a customer starts negotiations for a Linotype, they, at the same time, approach our competitor for matrices and you realise the reaction of the competition. Intertype can supply many more founts in many sizes than ourselves and for your information there is not a single Greek Newspaper or Magazine not using Intertype Greek faces even if the printers are Linotype Houses. There are, however, certain newspapers and magazines which are using only Intertype Matrices because they do not need us to supply them with any.⁸⁹

As a result of Intertype's competitiveness in matrix prices and delivery, Linotype had lost nearly 50 percent of the matrix sales in the Greek newspaper market by 1967. According to Albert Salt, General Sales Manager for Europe at MINT⁹⁰, by 1969 Intertype almost entirely dominated the matrix business.⁹¹ Linotype's slow matrix delivery in Greece was of great concern, and Salt expressed this in a letter to Walter Tracy⁹², Manager of Typeface Development at L&M:

As you well know Greek matrix deliveries from MLCO. and L&M are not good and the whole industry knows of our inability to supply matrices quickly for the composition of the Greek language. Intertype, on the other hand (from Berlin), have concentrated on providing text faces for Greece and it is correct to say that they now have 80% of the matrix business.⁹³

In addition to the competition for matrix sales with Intertype, senior management at Mergenthaler in New York were made aware of the existing dissatisfaction with Linotype's Greek typefaces in the Greek printing market at the IPEX trade exhibition in 1963. Louis Rossetto, Vice President of Research and Engineering at the Mergenthaler Linotype Company, urged Jackson Burke, Mergenthaler's Director of Typographic Development, to look into the matter:

As a matter of incidental IPEX information from some of our Greek representatives, there was the comment that someone like Jackson Burke should look into the Greek alphabet. It appears that there is dissatisfaction with the Greek available to the Greeks, this being expressed in

⁸⁸ Walter Tracy to Mike Parker, 'Caledonia Greek', 11 October 1963. File Caledonia Greek, Box 6, NMAH.

⁸⁹ Costas Pophaides to Ralph Goodman, 'Re: Greek matrices', 31 December 1969. File 20, Greek, WTC, DTGC.

⁹⁰ MINT stands for Mergenthaler International. MINT was based in Brussels and dealt with machine and typeface sales in the European printing markets.

⁹¹ Albert Salt to Mike Parker, Athens, 'Greece — Greek text and display faces', 27 January 1967. File 20, Greek, WTC, DTGC.

⁹² For biographical information, see Appendix B.

⁹³ Albert Salt to Walter Tracy, 'VIMA, Athens (Prop. of Mr. Dim. Lambrakis) — Exclusive rights to new face for news-paper composition', 21 April 1969. File 20, Greek, WTC, DTGC.

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Figure 3.2. Caledonia, designed by William Addison Dwiggins for the Mergenthaler Linotype Company (MLCo) in 1939. From *The International Type Book*, 216. 70% of original size.

two directions. The first is that the punches being used are old, and as such do not create good matrices; the second is that the styles themselves are old and need revision. [...] You may wish to look into the matter.⁹⁴

Furthermore, Costas Chrysochoides⁹⁵ had also expressed to Walter Tracy the opinion that Greek newspaper publishers had become tired of the sans serif style, more specifically Linotype's Metro Greek series, which had been widely used in newspaper setting (figure 3.1, page 44).⁹⁶ It was becoming evident that Linotype needed to compete more effectively with Intertype in order to increase its own matrix sales to Greek newspapers.⁹⁷ In the light of this, in April 1961 Jackson Burke indicated to Walter Tracy Mergenthaler's willingness to design a new Greek typeface:

The proposal embodied in your April 18th letter is reasonable and sound. We will undertake to supply 6, 8 and 9 point Greek with Bold within the period of one and one-half to two years. We will also undertake to provide the headletter, in the same face. It would be considered necessary to have the headletter available at the time text sizes were completed. My own choice for the style of the face is Caledonia. Our people have done so much with the face that they would be more comfortable in its adaptation. Too, I believe it would be more readily identified with Linotype, where Times Roman would not. All this is only valid because I believe the face will do both newspaper and book and/or periodical work admirably. The proposal is sound because of the volume of sales involved. If the quantities cited materialize, we can certainly justify the program.⁹⁸

Tracy's April 18th letter was not found in any of the archives available for this research. However, it is logical to assume that the design of a 6, 8 and 9 point Greek with a bold weight and a headletter was Tracy's proposal, and Burke is simply reinstating it in the quote above. The discussion that follows regarding the choice between Caledonia or Times as a model for the Greek typeface may also be Burke's response to what would have been suggestions made by Tracy. The letter quoted above gives the only reason found in archival sources why Caledonia, a book type with high contrast strokes, was chosen as the model for a new Greek typeface intended for use in Greek newspaper printing (figure 3.2). It can be surmised that Caledonia's versatility and commercial success, especially in the U.S. market, may have been a consideration for this choice;⁹⁹ a Greek typeface bearing the same name had a good chance of being as successful in the Greek printing market. Furthermore, Times was a typeface strongly associated with Linotype's other rival Monotype. However, Linotype was well-known for developing newspaper serif typefaces for its hot-metal typesetting system, and had more suitable typefaces on which to model a new Greek newspaper type on than Caledonia. Its widely-used 'Legibility Group' typefaces — Ionic No.5, Excelsior, Corona, Opticon and Paragon — were especially designed to withstand the punishing conditions of

94 Louis Rossetto to Jackson Burke, internal memo, 'Greek Alphabet', 5 September 1963. File Greek Miscellaneous, Box Historical (3/3), NMAH.

95 For biographical information on Costas Chrysochoides, see Appendix B.

96 Walter Tracy to Costas Chrysochoides, 19 June 1969. File 20, Greek, WTC, DTGC.

97 Costas Chrysochoides to Walter Tracy, 26 June 1962. File Greek Miscellaneous, Box Historical (3/3), NMAH.

98 Jackson Burke to Walter Tracy, 'Re: Greek', 21 April 1961. File Greek Miscellaneous, Box Historical (3/3), NMAH.

99 Caledonia was designed in 1939 by W. A. Dwiggin, and was much used in the setting of books as well as in commercial printing, especially in the U.S. See Lawson, Alexander, *Anatomy of a Typeface*, (Boston: David R. Godine, 1900), 244.

newspaper printing; they had legible characters with low contrast strokes and open counters which did not appear weak or grey when thinner inks were used or, if colour was increased, thick and smudgy on poor quality newsprint.¹⁰⁰

Tracy's response to Burke's letter does not survive in the archival sources accessed, but it is possible that he would have not entirely agreed with him. Tracy, throughout his long career at Linotype, had successfully designed a number of typefaces for newspapers, and therefore had in-depth knowledge of their specific typographic requirements. Although he thought Caledonia was an outstanding book type, he did not find it suitable for newspaper setting. High-speed production methods called for newspaper text types without much refinement as essential elements, such as bracketed serifs and punctuation marks, suffered a loss of definition through stereotyping, with an adverse effect on the texture of the type matter. In *Letters of Credit* he wrote:

Set a novel in a newspaper type and the effect will be so uninviting that the success of the work will be jeopardised. Set a newspaper in a book type and we will not take it seriously. (There was once a newspaper which used Caledonia for its text. That excellent book type helped the paper to gain awards for good design but, ironically, contributed to its early demise).¹⁰¹

Whatever the reasons may have been in choosing Caledonia for a Greek adaptation, they would most likely have included the following considerations: its use, i.e. what kind of text setting the typeface would be used for; the recommendations of Costas Chryssochoides, the Greek Linotype agent, based on his knowledge of the Greek printing market and the requirements of his clients; and the time it would take to complete the typeface and make it available in the Greek printing market. These considerations would make up a large part of the design brief for Caledonia Greek. Furthermore, it is understandable that Linotype chose to adapt a Latin typeface for Greek instead of developing a new Greek design from scratch. As Burke said, the Letterdrawing Department at Mergenthaler was already familiar with Caledonia and would be more confident adapting it within the proposed time scale. On the other hand, an entirely new Greek design would have needed considerably more research, as well as more trials, in order to perfect it thus making it more difficult to meet the deadline of one and half to two years. Last but not least, Burke's letter makes clear that sales of the typefaces, and therefore of machines, were also primary factors in the brief. As he points out, in order to justify the development of a new typeface, he would have needed some sales projections from Chryssochoides ('if the quantities cited materialize...').

From the beginning, the development of the typeface was beset by a number of delays. From 1961 through to 1963 deadlines were constantly pushed back when more pressing issues at Mergenthaler arose, such as a big matrix backlog due to changes made in the Teletypesetter programme.¹⁰² In the meantime, news that Intertype was preparing a new Greek typeface similar to Linotype's American Trade Gothic worried Costas Chryssochoides in

¹⁰⁰ Hutt, Allen, *The Changing Newspaper. Typographic Trends in Britain and America. 1622-1972*. (London: Gordon Fraser, 1973), 100-101.

¹⁰¹ Tracy, Walter, *Letters of Credit. A View of Type Design*, (London: Gordon Fraser, 1986), 32. Tracy is presumably referring to the New York newspaper *PM* which was published from 1940 to 1948. The text was set in 9 point Caledonia, and for its headlines Linotype cut a full range of display sizes up to 36 point. Hutt mentions that the typeface was possibly too beautiful for daily paper impact. Nonetheless, from 1941 to 1944 *PM* won first place in the Ayer Award's Tabloid Division. See Hutt, *The Changing Newspaper*, 151-153.

¹⁰² Walter Tracy to Jackson Burke, 'Greek', 11 April 1963. File Greek Miscellaneous, Box Historical (3/3), NMAH.

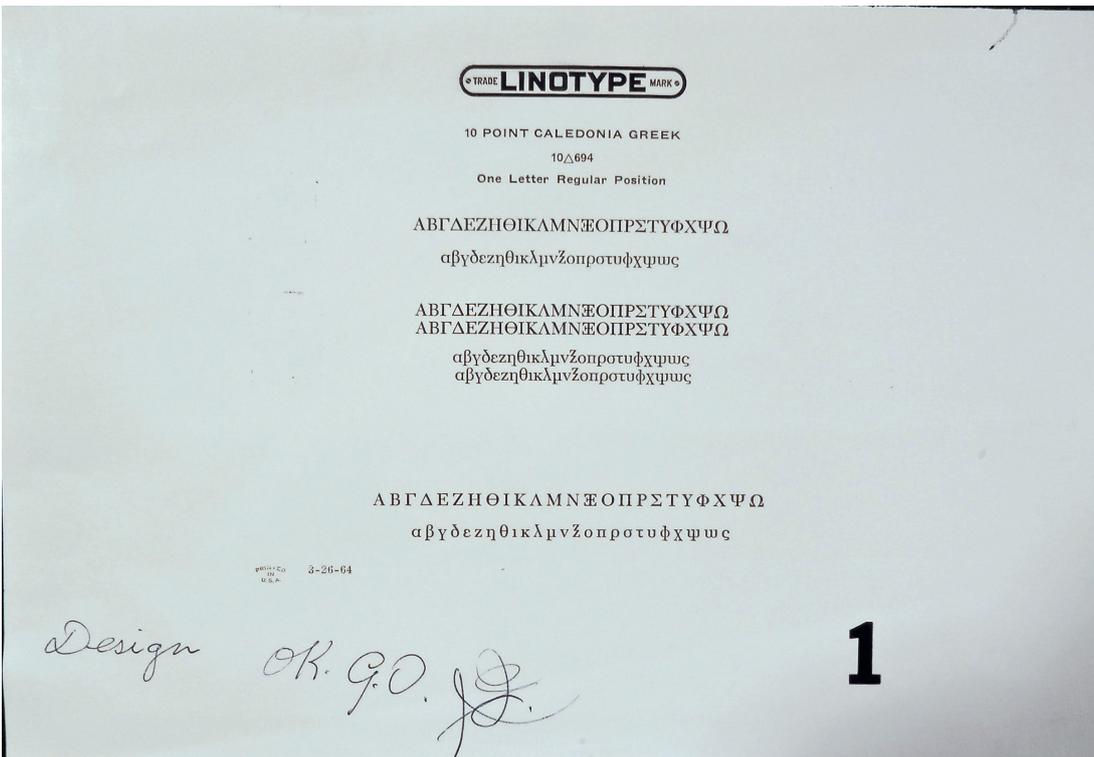


Figure 3.3. First character trial proofs of 10 point Caledonia Greek, dated 26 March 1964. The design is unusually upright and represents a departure from the tradition of cursive Greek typefaces that Linotype had produced up to that point. File Caledonia Greek, Box 6, NMAH, 77% of original size.

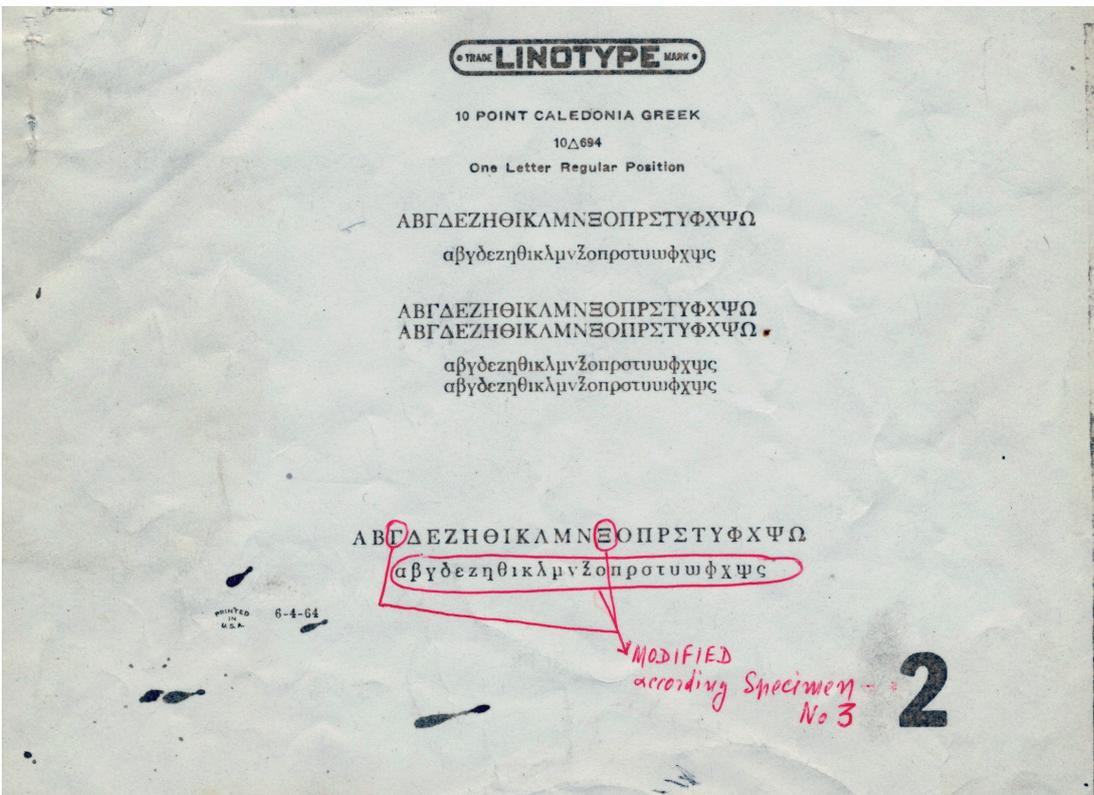


Figure 3.4. Second character trial proofs of 10 point Caledonia Greek, dated 6 April 1964. The proof is almost identical to the first proof above with the exception of uppercase xi (Ξ). File Caledonia Greek, Box 6, NMAH, 76% of original size.

case Intertype was able to offer its new typeface prior to the completion of Caledonia Greek.¹⁰³ Tracy, acting as an intermediary between Chrysochoides in Athens and Burke as well as Parker in New York,¹⁰⁴ repeatedly enquired on the progress of the project without much success. In one of his letters to Burke, Tracy emphasised that Linotype's inability to supply Chrysochoides with a new typeface was detrimental to the company's matrix sales:

[...] our overseas markets must be protected by the provision of new designs when the need for them is indicated to us — as was certainly done in regard to Greek.¹⁰⁵

The first trial character proof of Caledonia Greek was produced in March 1964 (figure 3.3). Parker sent it to Walter Tracy in London. In the accompanying letter, dated 27 April 1964, Parker wrote that Jackson Burke, George Ostrochulski¹⁰⁶ and himself, although pleased with the overall design, felt that three characters needed revisions before the proof could be sent to Chrysochoides for feedback. The letter was short, and Parker did not mention which characters were to be revised nor did he explain the reasons for the revisions.¹⁰⁷ In earlier correspondence, he had indicated to Tracy that the design was an upright 'roman' lowercase rather than the traditional Greek cursive form,¹⁰⁸ departing a good deal from the accepted tradition of Greek typefaces that Linotype had manufactured up until then¹⁰⁹ (see Appendix A for the typographic features of the Greek script). An entire lowercase, as opposed to a few selected characters, had been cut so that the designers at the Mergenthaler letterdrawing office could become familiar with all the challenges involved in designing for Greek, and have the opportunity to smooth out any problems early on in the process.¹¹⁰ The size of the new design on the proof was in 10 point — too large a size for newspaper setting as Tracy observed in his response to Parker:

The next thing that strikes me is that — contrary to all expectation and intention — you have made the trials in 10 pt. and not 8 pt. It is in the newspaper field that our agent wants to make his sales. His task in stimulating interest among his customers will be made more difficult by his having to show them proofs of trials in a size other than the size they are interested in (consider the Greek Metro range: no 10 pt. there.)¹¹¹

Regarding the design of the new typeface, Tracy was less forthcoming:

As to your design: I don't really know about Greek, and cannot comment; but I think the unusual forms will raise a few eyebrows.¹¹²

A second proof was produced at the beginning of June 1964 (figure 3.4). There is a gap in the correspondence between May and June 1964, and the next letter, dated 17 July 1964, is from

¹⁰³ Costas Chrysochoides to Walter Tracy, 26 June 1962. File Greek Miscellaneous, Box Historical (3/3), NMAH.

¹⁰⁴ The manufacture of typefaces for the European markets were the responsibility of L&M in the U.K. rather than Mergenthaler in the U.S., even though the design of Caledonia Greek was initiated in Mergenthaler's letterdrawing office.

¹⁰⁵ Walter Tracy to Jackson Burke, 'Greek', 11 April 1963.

¹⁰⁶ George Ostrochulski was the head of the Letterdrawing Department at Mergenthaler.

¹⁰⁷ Mike Parker to Walter Tracy, 27 April 1964. File Caledonia Greek, Box 6, NMAH.

¹⁰⁸ Mike Parker to Walter Tracy, 'Caledonia Greek', 14 October 1963. File Caledonia Greek, Box 6, NMAH.

¹⁰⁹ Mike Parker to Walter Tracy, 'Caledonia Greek', 9 October 1963. File Caledonia Greek, Box 6, NMAH.

¹¹⁰ Mike Parker to Walter Tracy, 'Caledonia Greek', 14 October 1963.

¹¹¹ Walter Tracy to Mike Parker, 'Greek', 1 May 1964. File Caledonia Greek, Box 6, NMAH.

¹¹² Ibid.

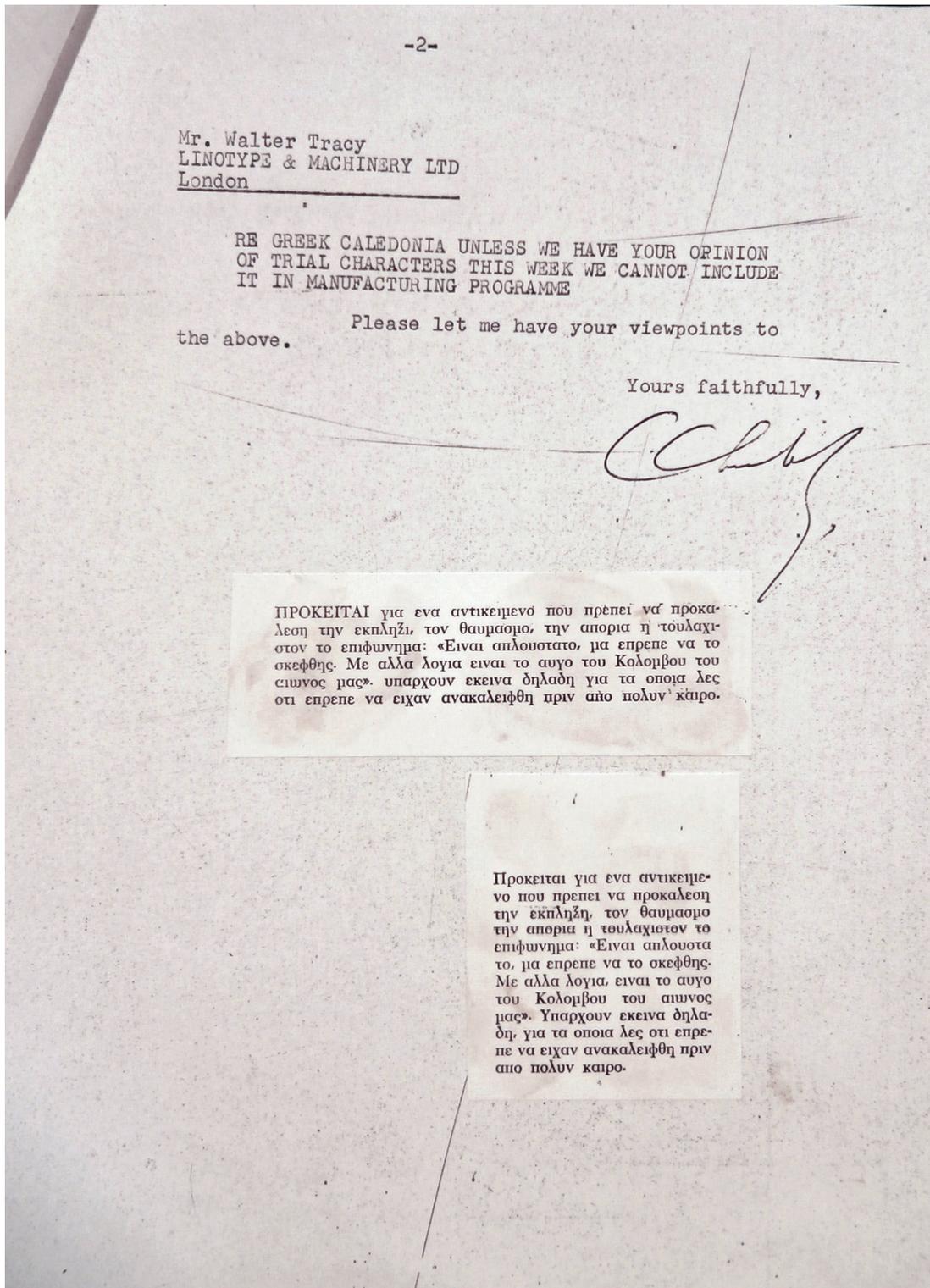


Figure 3.5. Second page from Costas Chryssochoides's letter, dated 3 December 1964, to Walter Tracy including trial text of 10 point Cadedonia Greek arranged in single and double column lines. Chryssochoides found a number of characters confusing and in need of modifications. File Caledonia Greek, Box 6, NMAH, 100% of original size.

Parker to Costas Chrysochoides to inform him that Mergenthaler was getting ready to airship 500 trial matrices of the 10-point Caledonia Greek upper- and lowercase to him. This information was followed by a short paragraph on the design of the typeface about which he wrote:

In our effort to produce a truly upright design, we have done the work as we believe it should be done typographically, realising that we may have gone beyond the boundaries set by custom in places. We rely on you, to suggest any modifications that may be necessary for practical production. I enclose alphabet proofs, and will forward some trial text setting on various papers as soon as it is complete.¹¹³

Tracy's remark on the unusual design was mirrored by Costas Chrysochoides when he replied to Mike Parker with his feedback:

Our customers, however, and some of them, who can express responsible ideas regarding the design of Greek letters, advised us that a number of characters must be redesigned. We hope that within the next few days, we will be able to furnish you with detailed information about the modifications which are necessary. We would request you in the meantime not to airship the 500 mat trial font mentioned in your letter under reply. Please wait for our further news in this very interesting matter.¹¹⁴

Further correspondence from Chrysochoides specifying character modifications based on the second proof has not been found in company archives. Examining both extant proofs, it is not difficult to identify the characters that would have elicited surprise. The shapes of the uppercase characters in both proofs appear sufficiently conventional (tables 1 and 2, page 66). However, the entire lowercase in both proofs looks unusually angular, and many letterforms are taken from the Latin Caledonia and modified to create Greek letterforms, i.e. the lowercase lambda (λ) is essentially an upside down 'y' (table 3, page 68). What Tracy describes as 'the unusual forms' must have also included lowercase gamma (γ), delta (δ), xi (ξ), psi (ψ) and omega (ω) (tables 3 and 4, page 68).

Chrysochoides did write to Parker on 16 November 1964 to confirm that he had received trial matrices of Caledonia Greek on 30 October 1964. Whether these matrices were different from the ones Mergenthaler wanted to airship in May is not clear. He was, however, in the process of producing text setting proofs from them:

We are now making texts from the above matrices which are distributed to various customers in order to select their opinion or the modifications necessary to be made in the characters designed by yourselves.¹¹⁵

Copies of the trial text proofs in single and double column lines were pasted on his next letter, dated 3 December 1964, addressed to Walter Tracy this time. Chrysochoides found the results less than pleasing and to that effect he wrote to Tracy (figure 3.5):

[...] Please find attached herewith two specimens of single and double column lines, from which you will notice that the Greek version of the Caledonia is not satisfactory. Although our language

¹¹³ Mike Parker to Costas Chrysochoides, 17 July 1964. File Caledonia Greek, Box 6, NMAH.

¹¹⁴ Costas Chrysochoides to Mike Parker, 5 August 1964. File Caledonia Greek, Box 6, NMAH.

¹¹⁵ Costas Chrysochoides to Messrs, Mergenthaler Linotype Company, 16 November 1965. File Caledonia Greek, Box 6, NMAH.

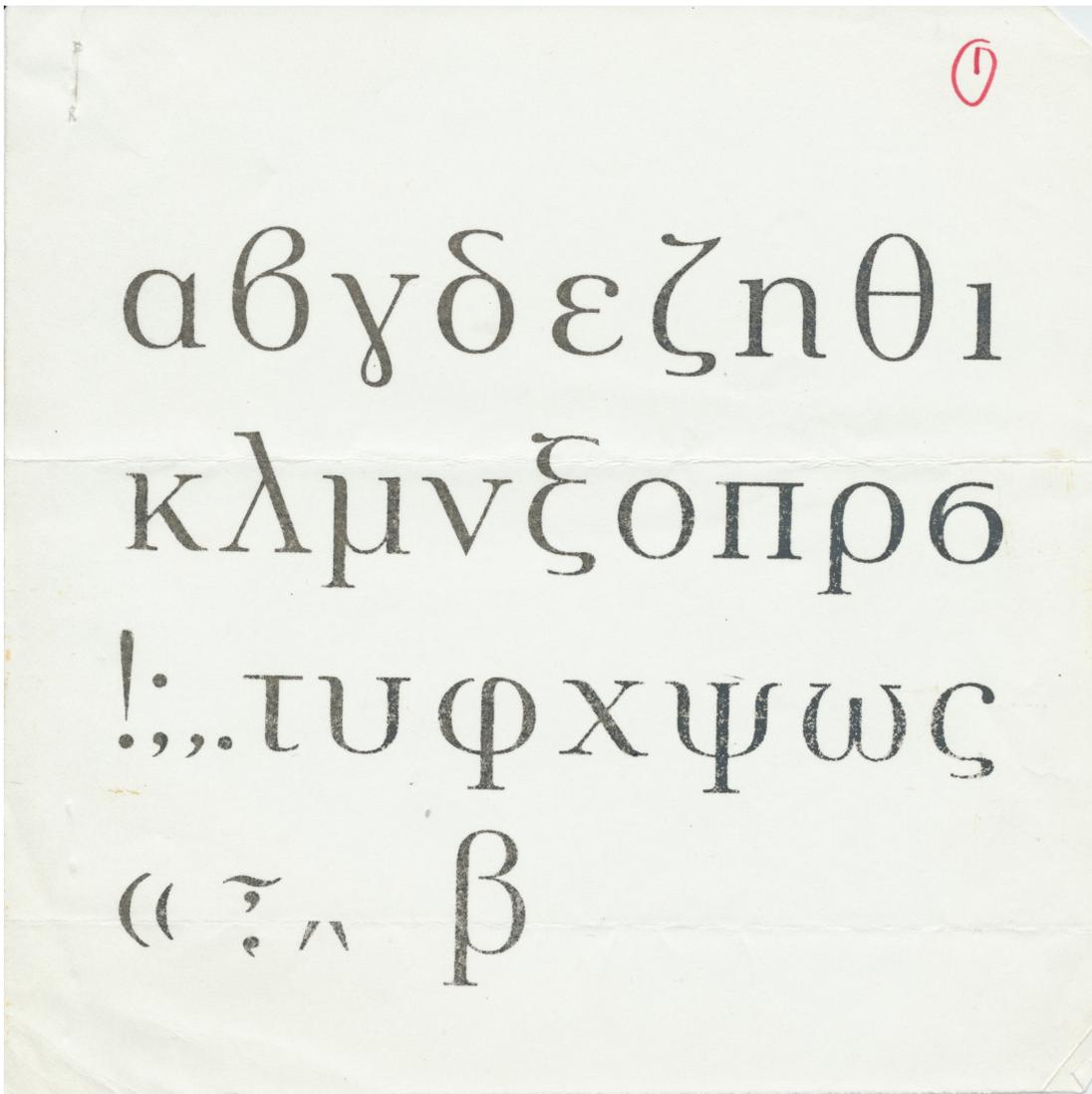


Figure 3.6. Facsimile of the revised version of Caledonia Greek drawn by Grigoris Asteriades. The characters are more cursive in comparison to previous proofs, although they still retain their serifs. There is also a higher contrast between thin and thick strokes. Undated. LGA, DTGC, 85% of original size.

is not known to you, it appears that the many serifs used are confusing, some characters need redesigning and some also need corrections.¹¹⁶

It also appears that Chrysochoides had been told by Mergenthaler that any further corrections he felt were needed to the character sets must be organised by him. He wrote:

We are given to understand that the correction of the various characters (lower case only) must be made by us. We are already discussing this serious matter with some customers, who can have previous experience in the design of Greek characters and are preparing the drawings of the correct ones. This, however, will take additional time. In other words, I do not believe that I will be able to send to you the details mentioned above before the middle of this month.¹¹⁷

Judging from the quote above, it appears that at this point in time Mergenthaler relinquished control of the design and handed over its art direction to their sales representative. As there is a gap in the available correspondence, this curious turn of events cannot be fully explained. It is possible that, since the matrix backlog had caused Mergenthaler to prioritise other work, the design of Caledonia Greek had lost some momentum. As is demonstrated below, the project had now become to a large extent the responsibility of Chrysochoides, and for the preparation of the new lowercase character drawings, he worked with Grigoris Asteriades, a local graphic artist. He sent the complete drawings to Walter Tracy on 18 December 1964 along with indications of all the corrections made in an effort ‘to eliminate the hardness in the design’ and produce subtler and more familiar Greek letterforms (figure 3.6). He informed Tracy that the uppercase characters as designed by Mergenthaler did not need any corrections ‘because they are perfect from all points of view’, except for xi (Ξ) which needed a shorter middle stroke, and gamma (Γ) whose top stroke also needed to be shortened.¹¹⁸ At a later date, he also requested that three sizes be made in each of the two weights; 6.5 or 7, 8 and 10 point for the regular and 6.5 or 7 point, 8 and 14 point for the bold.¹¹⁹

Tracy sent the new drawings to Mergenthaler in New York, and neither himself nor Mike Parker had any objections to the changes made to the lowercase alphabet. Tracy was impressed with the drawings themselves which he thought were ‘expertly done’.¹²⁰ However, he thought that the lowercase nu (ν) needed additional strength at the baseline, the punctuation was feeble, and the accents needed to be reshaped by the Mergenthaler Letterdrawing Department.¹²¹ Parker planned to follow the new design as it was, departing from it only where necessary.¹²² In a memo to George Ostrochulski, the head of the Mergenthaler letterdrawing office, he appeared to think that the design was nearing completion:

While the bulk of the lowercase characters have been changed, you will note that our system of weights and upright romanisation has largely been followed. The changes suggested by

¹¹⁶ Costas Chrysochoides to Walter Tracy, 3 December 1964. File Caledonia Greek, Box 6, NMAH.

¹¹⁷ Ibid.

¹¹⁸ Costas Chrysochoides to Walter Tracy, 18 December 1964. File Caledonia Greek, Box 6, NMAH.

¹¹⁹ Costas Chrysochoides to Walter Tracy, 29 December 1964. File Caledonia Greek, Box 6, NMAH.

¹²⁰ Walter Tracy to Costas Chrysochoides, ‘Caledonia Greek’, 21 December 1964. File Caledonia Greek, Box 6, NMAH.

¹²¹ Walter Tracy to Mike Parker, ‘Caledonia Greek’, 21 December 1964. File Caledonia Greek, Box 6, NMAH.

¹²² Mike Parker to Walter Tracy, ‘Caledonia Greek’, 15 January 1965. File Caledonia Greek, Box 6, NMAH.

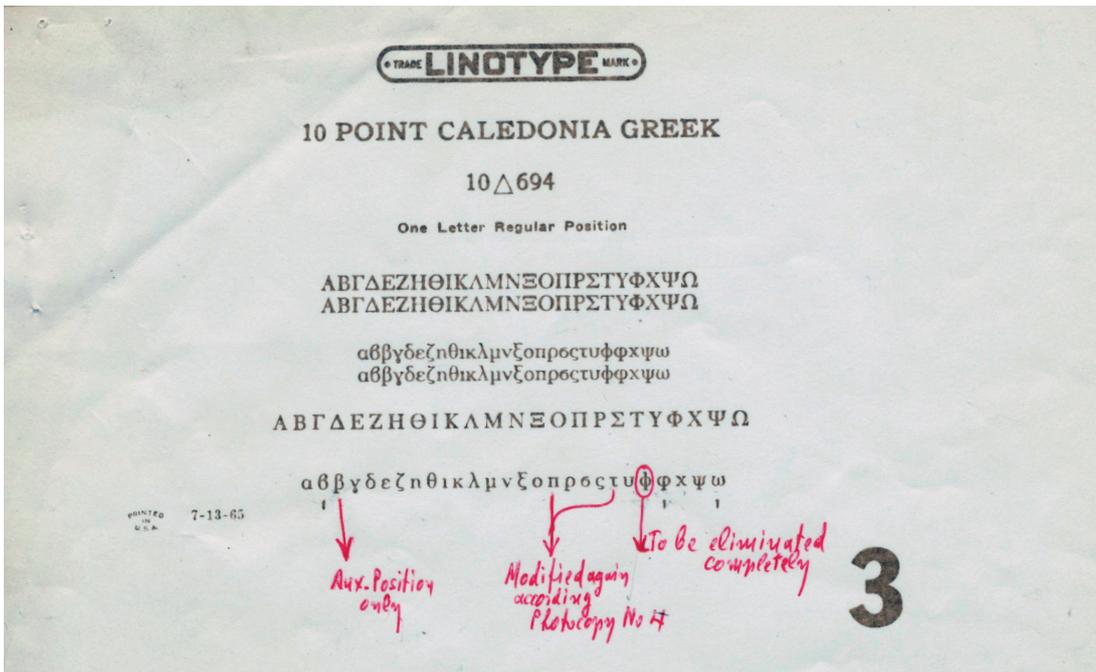


Figure 3.7. Third trial character proofs of 10 point Caledonia Greek, dated 13 July 1965. This is the character set that Asteriades redrew as depicted in figure 3.6 (page 54) where lowercase characters retain their serifs at the end of descenders. LGA, DTGC, 80% of original size.

Chrysochoides are aimed at modifying our system to produce subtler and more familiar Greek letterforms. Comparing the improved version with existing Greek faces we should be approaching a first class design.¹²³

Asteriades's drawings were a departure from Mergenthaler's original design. The characters he drew were more cursive in comparison to those that can be seen in the first two proofs that Mergenthaler produced. Whereas Mergenthaler's design had been modelled on the Latin Caledonia — many of its original Latin characters were used unchanged or were modified to form the Greek letterforms — Asteriades's design tried to restore the conventional features of the Greek script, thus moving the design away from its original source (figure 3.6, page 54). However, he did retain the serifs on the characters, and the contrast between the thin and thick strokes became greater. As indicated by Tracy, high contrast characters are acceptable for book faces, but may lose much of their substance when used in newspaper printing. Indeed, the characters Asteriades drew contained many fine details; they appear to be the work of a lettering artist rather than a draughtsman who has routinely interpreted drawings specifically for hot-metal type manufacture. Tracy's comment about the lowercase nu (ν) needing additional strength at the baseline may point to Asteriades's lack of sufficient experience in the manufacture of metal type.

New proofs set from matrices based on Asteriades's drawings were scheduled for April 1965. Due to the increasing production and continuing backlog in matrix manufacture at Mergenthaler, they materialised in late July and were forwarded to Tracy and Chrysochoides in early September (figure 3.7).¹²⁴ In a brief letter accompanying the third proof, Parker wrote to Tracy that he had also sent new matrices to Chrysochoides. Although generally happy with the typeface, Parker was still unsatisfied with some of the characters:

I think in the main it's good, but there are details that leave me unhappy. If you'd like to make it — it's yours — and please feel free to change and finish it as you see fit. Let me know if you want it and I'll route the comments from Athens, the drawings, the matrices and patterns and punches to you.¹²⁵

Parker's letter was brief, and he did not specify which characters left him unhappy. He also seemed to suggest handing over the Caledonia Greek project to Tracy. By the summer of 1965, the Mergenthaler factory in New York was operating well above capacity and, to alleviate the excessive workload, it was agreed that some of the work was to be transferred to the L&M's matrix factory in Altrincham, outside Manchester. The transfer included all matrix fonts that were sold largely in markets which were the responsibility of L&M, such as the Linotype Greek and Indian ones.¹²⁶ Mergenthaler provided complete sets of punches, original drawings and all the matrices in stock whilst retaining the patterns and microfilms of drawings. With the transfer of work from Mergenthaler to L&M, the responsibility for

¹²³ Mike Parker to George Ostrochulski, internal memo, 'Subject: Linotype Caledonia Greek', 26 January 1965. File Caledonia Greek, Box 6, NMAH.

¹²⁴ Mike Parker to Walter Tracy, 'Caledonia Greek', 17 May 1965. File Caledonia Greek, Box 6, NMAH.

¹²⁵ Mike Parker to Walter Tracy, 'Caledonia Greek', 30 August, 1965. File Caledonia Greek, Box 6, NMAH.

¹²⁶ These included earlier Linotype Greek typefaces Porson Greek, Greek No.1, Greek No.2, Greek No.3, Greek Bold Face 1, Greek Italic No. 1, Greek Elzevir, Greek Metrolite No.2, Greek Metromedium No.2. Mike Parker to John Parsons, 19 October 1965. WTC, File 17, Non-Roman General, DTGC.



Figure 3.8. Facsimile of a section of a page from *Mesogeios* newspaper showing some of the body text set in 10-point size Caledonia Greek alongside 8-point Greek Metrolite, part of Linotype's Greek Metro series. The newspaper bought only a single set of matrices from Costas Chryssochoides. Circa 1967-68. LGA, DTGC, 70% of original size.

Caledonia Greek changed hands;¹²⁷ Parker's involvement ceased and the typeface became Walter Tracy's responsibility, although Costas Chrysochoides was still in charge of its design. The handover of the project is officially confirmed in a letter from Mike Parker to John Parsons, the Managing Director of L&M, in October 1965:

We have given you the new Caledonia Greek; the Greek agency is currently testing our latest trial alphabet for acceptance in Greece; Walter Tracy should be getting the results soon. If the design is approved in its current form, you will have the best part of the drawings necessary for some four fonts of manufacture. We will send you all drawings, punches and trial one-letter matrices.¹²⁸

The first indications regarding the reception of Caledonia Greek in Athens were recorded in Tracy's letter, dated 19 January 1966, to Parker to inform him of the following:

At last we have some indication from Chrysochoides about the local reception of the trial characters. In a letter to Frank Trice covering a number of matters, he says (if I understand him correctly) that two lower case characters need modification. He says further that he will soon want to place orders for the 10 pt. size — up to 20 founts to begin with — which seems a clear indication that the face has met with fair approval.¹²⁹

Two trial character proofs produced by L&M in November 1966 in the Linotype Greek Archive show that more than two characters were modified; they include the uppercase delta (Δ), eta (H), xi (Ξ), tau (T) and phi (Φ) and the lowercase gamma (γ), zeta (ζ), kappa (κ), phi (ϕ), xi (ξ), psi (ψ) and theta (θ) of the 10 point Caledonia Greek Bold. After 1965, information from archival sources on the continuing development of the typeface becomes more uneven compared to the period between 1961 and 1965; there is less correspondence or other office paper work documenting the stages of development of Caledonia Greek, therefore the gaps in time are longer. In 1968, the typeface was still nowhere near completion; from all the point sizes Chrysochoides had requested L&M to manufacture, Caledonia Greek was only available in 10 point. The reason for this may have been linked to its local reception; it appears that Caledonia Greek had not elicited the anticipated positive response from Chrysochoides's clients from the newspaper and magazine publishing. A memo from Walter Tracy, who had recently been to Athens to see Chrysochoides, to John Parsons gave an account of the local reception and sales of the typeface:

A short time ago Chrysochoides told Arthur Walker that the new Caledonia Greek design had not proved acceptable to newspaper customers. I discussed the subject with Chrysochoides on Thursday and Friday of last week. So far we have made only the 10 point Caledonia Greek. Costas has sold 15 sets to 14 book and jobbing printers in a year. One set has been sold to a small newspaper in Crete. He has 5 sets in his stock. I pointed out that 10 point is not a size which interests newspapers, and it might be that if the 8 point size was made and shown to them they would become interested. Costas doubts this; quoting Mrs Vlachou,¹³⁰ he says the face is evidently too pretty. I pointed out to him that there are 8 lower case letters which are unusual

¹²⁷ Ibid.

¹²⁸ Ibid.

¹²⁹ Walter Tracy to Mike Parker, 'Caledonia Greek', 19 January 1966. File Caledonia Greek, Box 6, NMAH.

¹³⁰ Helen Vlachos was the influential proprietor of *Kathimerini* and *Mesimvrini*, two of Greece's biggest daily newspapers, and the illustrated magazine *Eikones* (*Pictures*).

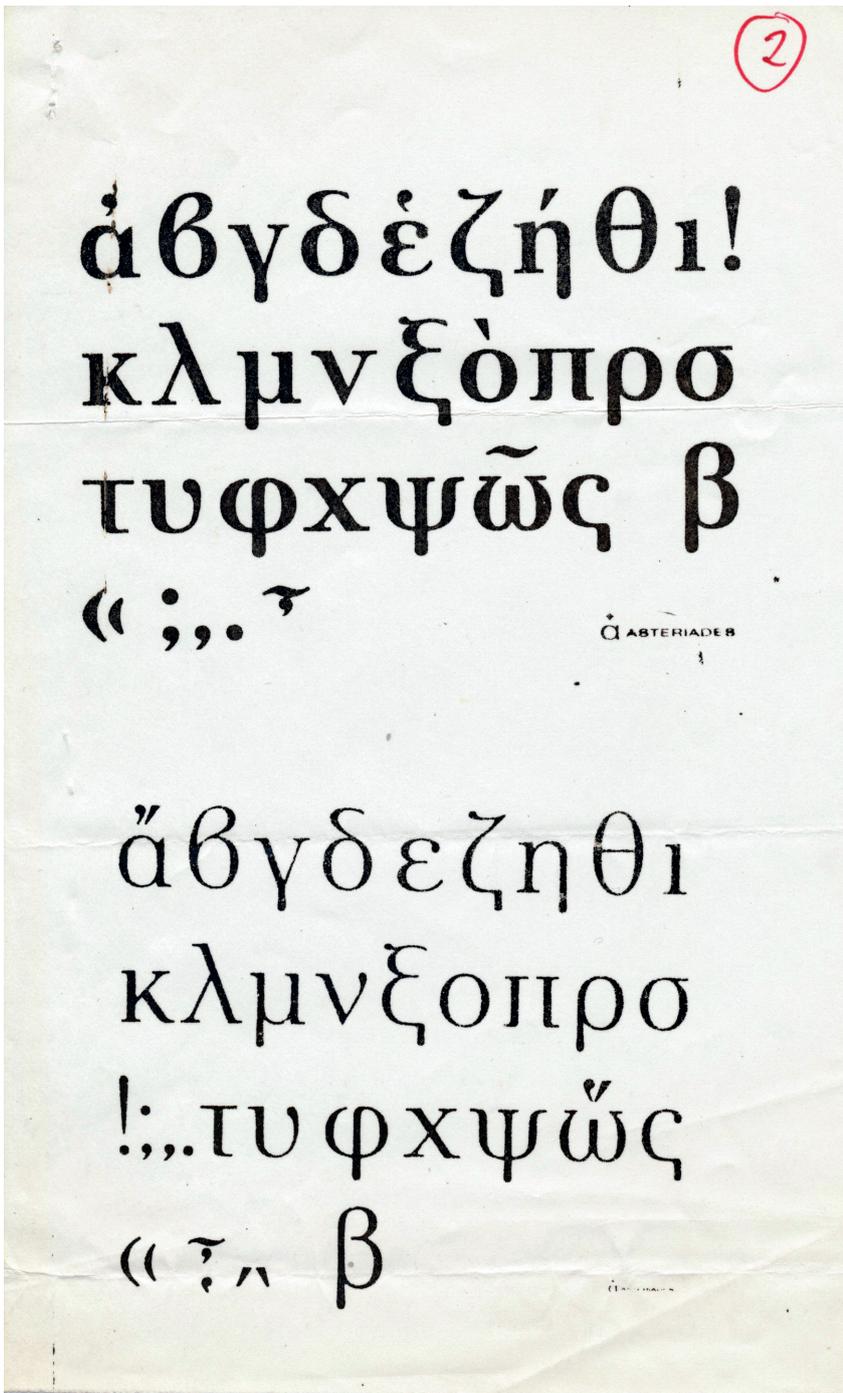


Figure 3.9. Facsimile of revised set of drawings of Caledonia Greek by Asteriades. Serifs have been removed from the ascenders of characters, such as mu (μ) and xi (ξ). There is also a bold style, as well as modifications to the following characters: gamma (γ), zeta (ζ), eta (η), xi (ξ), pi (π), rho (ρ), sigma (σ), upsilon (υ) and alternate (ς). Undated. LGA, DTGC, 75% of original size.

in design, and he agreed that it might well be that if they were re-designed in orthodox style and incorporated in the 8 point version first, the newspapers might find the face acceptable. He called in Asteriades, the designer of the lower case, and discussed the characters with him. The designer will supply revised versions in the normal weight and also in the bold. I pointed out that since the lower case was designed in Athens, the cost of revision might have to be borne by Chrysochoides. He is considering the implications of this and will write to us when he has decided what should and can be done.¹³¹

Despite Asteriades's improvements on the original Mergenthaler design, Chrysochoides had only managed to sell a single set of matrices to one local newspaper. Given that Caledonia Greek was aimed at the Greek newspaper market, this news must have been very disappointing for Linotype. The small newspaper in Crete was *Mesogeios*, and a facsimile of a section of a page with body text set in 10-point Caledonia Greek is included in the Linotype Greek Archive (figure 3.8, page 58). It is set alongside text in 8-point Metrolite, part of Linotype's widely-used Greek Metro series. At 10 point, Caledonia Greek looks uneven; the characters have lost much of their definition due to the contrast between their thick and thin strokes and the inconsistent spread of the ink on the paper. The typeface also compares unfavourably next to the 8-point Greek Metrolite whose low contrast makes it appear more robust, and as a result withstands the poor quality printing better.

Shortly after Tracy's Athens visit in February 1968, Chrysochoides decided to go ahead with further revisions to Caledonia Greek's lowercase characters. Although Chrysochoides's letter confirming this has not been found, his decision is reflected in Tracy's response of 16 February 1968:

Thank you for your letter of 12 February, which clearly sets out the effect of our discussions during my recent visit to Athens. I look forward to receiving the revised designs of the 8 lower-case characters, which will be designed by Mr. Asteriades and which he will be trying out in word form before they are sent. The same will be done in the case of the bold design, for which you will send us a complete lowercase alphabet, including revised characters.¹³²

The revised drawings were received by Tracy at the beginning of September 1968 (figure 3.9). The drawings are undated and Chrysochoides's accompanying letter was not found; however, included in the Linotype Greek Archive is a list of character revisions Tracy drew up which states that Chrysochoides's letter was dated 7 September 1968 (figure 3.10, page 62). The list maps out all the modifications Asteriades made character by character. Out of the 26 lowercase characters (including alternate letterforms) listed, only eight had not been altered in some way; alpha (α), alternate beta (β), delta (δ), epsilon (ϵ), theta (θ), iota (ι), omicron (\omicron) and omega (ω). Serifs were taken out of five characters; beta (β), mu (μ), rho (ρ), phi (ϕ), psi (ψ). Sigma (σ) was redesigned, and the rest of the characters had the following alterations made:

- Gamma (γ), zeta (ζ), xi (ξ) and final sigma (ς) had new tails.
- Eta (η) had a new leg.
- Kappa (κ) had the top of its stem altered.

¹³¹ Walter Tracy to John Parsons, internal memo, 'Caledonia Greek', 6 February 1968. File 20, Greek, WTC, DTGC.

¹³² Walter Tracy to Costas Chrysochoides, 16 February 1968. File 20, Greek, WTC, DTGC.

CALEDONIA GREEK

Analysis of revised lowercase alphabet sent by Costas in his letter
7 Sept 68

v	25	α	No change		
	202	β	No change		
	26	β	Serifs deleted		
	27	γ	x Single tail	v	
	28	δ	No change		
v	29	ε	No change		
	30	ζ	New tail		
v	31	η	x New leg	v	
	32	θ	No change		
v	33	ι	No change		
	34	κ	Top of stem altered		
	35	λ	x Leg: single serif	No real difference	
	36	μ	Leg: no serifs		
	37	ν	x Curved arm	v	
	38	ξ	Straight tail		
v	39	ο	No change		
	40	π	x Flat top, single serif on legs	Top not strong enough	Use original
	41	ρ	Serifs deleted		
	42	σ	x New design	v	re design
	43	ς	Straight tail		
	44	τ	x Flat top	See 40 π	use original
v	45	υ	Curved arm		
	46	φ	Serif deleted on tail		
	47	χ	x Extremities angled	No real difference	use original?
	48	ψ	Serifs deleted on tail		
v	49	ω	No change		

x Agreed to re-use: see Costa's letter 12 Feb 68

26 8nc = 18c

Figure 3.10. List of revised characters for Caledonia Greek. The list was drawn up by Walter Tracy and maps the alterations made to the characters in figure 3.9 (see page 60) as listed in Chrysochoides's letter of 7 September 1968. Undated. LGA, DTGC, 70% of original size.

- Lambda (λ) had a single serif on its leg.
- Nu (ν) and upsilon (υ) had carved arms.
- Pi (π) had a flat top and a single serif on its legs.
- Tau (τ) had a flat top.
- Chi (χ) had its extremities angled.

This revised version of Caledonia Greek is significantly different to the one that the newspaper *Mesogeios* had purchased. The modifications that were made are notable, especially the removal of the serifs from a number of characters which had altered the look and feel of the typeface. Although Caledonia Greek was closely modelled on its Latin counterpart, the second set of drawings by Asteriades moved it markedly away from it. The design has little in common with its original counterpart, even if the Latin influence is still evident. Asteriades's second set of drawings corresponds closely with the iteration of Caledonia Greek that is shown in the *Stempel Information* type specimen for photocomposition (figure 3.11, see page 64). There are subtle differences in some characters; for example, lowercase lambda's (λ) main stem is more curved than the lambda in Asteriades's drawing. Otherwise the character set appears as Asteriades's drew it, and there appears to be no significant change in its stroke contrast.

The prospect of having to modify a significant number of lowercase characters was a vexing experience for Tracy. In a draft response in April 1969 to a letter by Albert Salt from MINT regarding the development of a hot-metal face for the Greek national daily *To Βήμα* (*To Vima*), he wrote:

No doubt it is very much in your mind that we have spent a great deal of time and effort developing the Caledonia Greek design, and we have recently had the galling experience of being obliged to re-draw and re-cut 40 lowercase characters because Costas's designer changed his view after 20 sets had been supplied and sold — with Costas's support. This makes it a little difficult to develop enthusiasm for another Greek type design.¹³³

Nonetheless, in 1969 the need for new Greek typefaces for hot-metal seemed to be acute also in the printing market in Cyprus; Linotype's Export Sales Manager Ralph Goodman was petitioned by the local Linotype agent Costas Pophaides for a new design.¹³⁴ Goodman referred the request to Tracy who responded by relating the latest news in the development of Caledonia Greek:

Presumably he [Pophaides] is in touch with Chrysochoides from time to time; yet his letter makes no mention of the Caledonia Greek. Caledonia Greek was started as a response for a new typeface. The lowercase was designed in Athens by an artist selected by Chrysochoides, who approved the design before sending it to us. After the face was manufactured on 10 point and 20 sets supplied to Costas, he and his designer decided to re-design a number of the lowercase characters, which have been completed. Does not Pophaides know of this effort by L&M, and the delay in the outcome caused by Costas?¹³⁵

¹³³ Walter Tracy to Albert Salt, 'Vima Athens', draft, April 1969. File 20, Greek, WTC, DTGC.

¹³⁴ Costas Pophaides to Ralph Goodman, 'Re: Greek Matrices', 31 December 1969.

¹³⁵ Walter Tracy to Ralph Goodman, 'Greek Type Faces', 20 January 1970. WTC, File 20, Greek, DTGC.

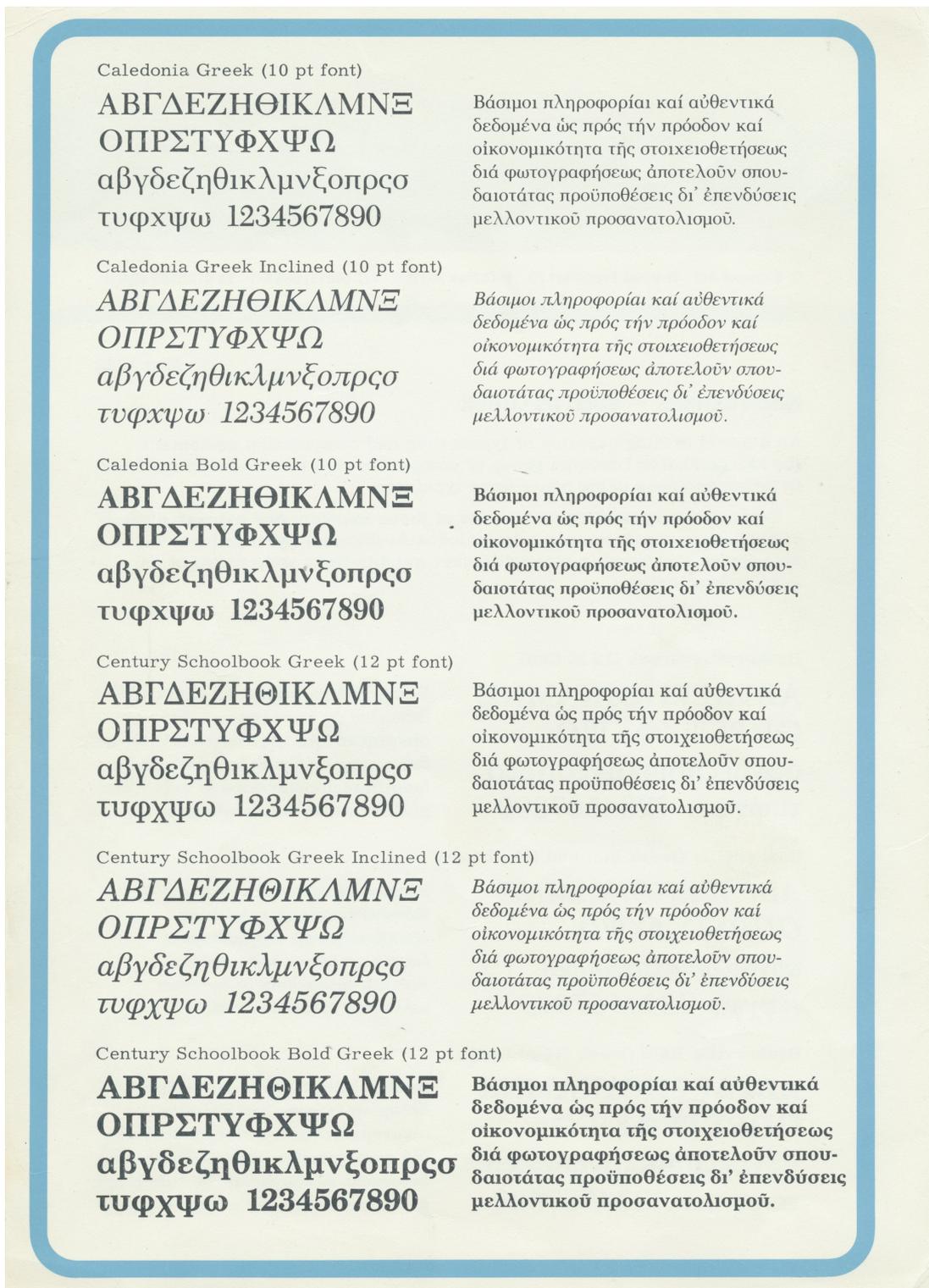


Figure 3.11. Page from *Stempel Information Photocomp Type Faces. Non-Romans – such as Greek type specimen* (1980) showing the final iteration of Caledonia Greek. The typeface became available for phototypesetting in 1971. LGA, DTGC, 69% of original size.

Lack of additional correspondence prevents from ascertaining exactly when Caledonia Greek was completed. However, it can be surmised that the project came to an end sometime in 1970. The reason for this speculation is provided by two letters exchanged between Chrysochooides and Tracy in February 1971. Chrysochooides wrote to Tracy regarding a MINT circular announcing the deletion of the 6, 12 and 14 point Caledonia (Latin) with italic, as well as the 8 and 10 point Caledonia (also Latin) with bold from Linotype's list of available faces. This caused Chrysochooides consternation as evidently many of the typefaces he was selling were for biligual setting use, and therefore required Greek and Latin fonts of the same typeface. This is made evident in the following extract:

In the meantime, however, we are proceeding with the preparation of additional Greek Caledonia sizes and the most serious matter is that our new 505C customer is almost convinced to include in his grids equipment a mixed Greek-Roman Caledonia one, which, no doubt, will be extensively used and for a long time.¹³⁶

What is also made evident in the above quote is that not only Caledonia Greek was available for hot-metal but also for photocomposition. The availability of the typeface is also confirmed by Tracy's reassuring response to Chrysochooides; the MINT circular was referring to English-depth matrices of Caledonia which were no longer ordered in sufficient quantities to justify manufacture. The Greek printing market was a Linotype territory that used American-depth matrices. He explained further:

In this country [UK], Caledonia is chiefly used as a book type, so the bold version is not much required. In America, the whole Caledonia range, including the bold, is extremely popular. Every type face we make is considered on its own merits. You need not fear that the Linotype Caledonia Greek will be affected by decisions we make about Roman type faces. You can advertise and sell Caledonia Greek in both its Linotype and film-setting form. And the same applies to Caledonia Greek Bold for which, as you know, we have the design and which we are ready to make whenever we receive an order to justify manufacture.¹³⁷

Overall, the period of development of Caledonia Greek appears to have been a frustrating one for the staff at Linotype. Correspondence demonstrates that its lack of commercial success, and by extension lack of increased machine sales, was perceived as Chrysochooides's fault. Arthur Walker, Director of the L&M factory in Altrincham, makes that very clear in a letter to Mike Parker, dated 7 April 1971, addressing the possible manufacturing of matrices for Helvetica Greek (see chapter 5 for its development for photocomposition) at L&M:

[...] we are at the moment in no position to undertake the manufacture of a new range of Greek matrices, in view of our commitments with other non-Roman faces which are related directly to potential machine sales and not purely matrix sales. For this reason I want to be quite sure that Costas Chrysochooides not only feels that he needs this face for hot metal sales, but is also prepared to place a firm order for a minimum quantity of founts in each size contemplated, before either MLCo or L&M commit themselves to manufacture. I enclose a copy of a letter from Costas, from which you will note that he claims he is prepared to place an order for 10 founts of each of four diamond numbers. I should tell you that he made similar claims about Caledonia Greek, and it took us about three years to get an order out of him. This could be because the face

¹³⁶ Costas Chrysochooides to Walter Tracy, 'L&M Matrices Discontinuance', 19 February 1971. File 20, Greek, WTC, DTGC.

¹³⁷ Walter Tracy to Costas Chrysochooides, 'L&M Matrices discontinued', 25 February 1971. File 20, Greek, WTC, DTGC.

TABLE 1 Caledonia Greek and Latin uppercase characters (A-M)												
1. March 1964	A	B	Γ	Δ	E	Z	H	Θ	I	K	Λ	M
2. April 1964	A	B	Γ	Δ	E	Z	H	Θ	I	K	Λ	M
3. July 1965	A	B	Γ	Δ	E	Z	H	Θ	I	K	Λ	M
4. Final version	A	B	Γ	Δ	E	Z	H	Θ	I	K	Λ	M
5. Caledonia (Latin) uppercase	A	B	F	A	E	Z	H	O	I	K	V	M

TABLE 2 Caledonia Greek and Latin uppercase characters (N-Ω)												
1. March 1964	N	Ξ	Ο	Π	P	Σ	T	Υ	Φ	X	Ψ	Ω
2. April 1964	N	Ξ	Ο	Π	P	Σ	T	Υ	Φ	X	Ψ	Ω
3. July 1965	N	Ξ	Ο	Π	P	Σ	T	Υ	Φ	X	Ψ	Ω
4. Final version	N	Ξ	Ο	Π	P	Σ	T	Υ	Φ	X	Ψ	Ω
5. Caledonia (Latin) uppercase	N	E	O	I	P	M	T	Y	IO	X	IU	O

Tables 1 and 2. The first three rows show the design evolution of each Caledonia Greek uppercase character across the three proofs that were issued — the first two show Mergenthaler’s design whilst the third shows the characters designed by Crigoris Asteriades. The fourth row displays the final iteration of Caledonia Greek uppercase as seen in Linotype’s specimen of Greek typefaces for photocomposition (figure 3.11, p.64). The fifth row shows the Latin Caledonia’s uppercase characters in order to demonstrate the formal similarities between the Latin and Greek uppercase alphabets.

didn't suit the market, despite the fact it was his choice, or it could be that it is Costas not living up to his promises. [...] I have had considerable amount of experience in dealing with Costas, and from this I have learned that you have to pin him down before embarking on any major investment, which this project certainly is.¹³⁸

Nonetheless, Chrysochoides was not to blame for the unsuccessful outcome of the Caledonia Greek project. All the available archival information points to a number of wider issues that contributed to the lack of the typeface's commercial success. Firstly, the development of the design appears not to have been a priority for Mergenthaler, and the project lost momentum by the continuous setbacks it suffered. Secondly, there was a lack of art direction and firm leadership as during different stages in its development the typeface design changes hands between Parker, Chrysochoides and Tracy. Thirdly, their inputs were not informed by expertise or sufficient research into the Greek typographic tradition. It is especially curious that Linotype relinquished control of the development in-house, and entrusted its completion to its agent who did not appear to have the required qualifications to lead such a project. Indeed, through lack of evidence to the contrary, the assignment of the project to Chrysochoides seems to reveal both a lack of responsibility and common sense on Linotype's part. Therefore the result was an inconsistent design that did not make the anticipated commercial impact in the Greek printing market.

The overly upright quality of the typeface seen in the first two proofs indicate Mergenthaler's lack of research into the script's typographic tradition during the early stages of development. The results made customary cursive lettershapes look unusual to Greek eyes and led to the revision of almost the entire lowercase. A better understanding of the Greek script would have facilitated more informed design decisions and a clearer vision. Although Chrysochoides and Asteriades set out to improve Caledonia Greek, their lack of technical expertise resulted in a high contrast typeface that moved away from Caledonia's essential quality. It also needed more revisions than expected before a satisfactory result was reached. In view of these factors, it is not surprising that Caledonia Greek did not have the anticipated commercial impact in the Greek printing market, especially in newspaper and magazine publishing for which it was originally intended.

3.3 Evaluation of Caledonia Greek

The evaluation that follows concentrates mostly on the final iteration of Caledonia Greek, including upper- and lowercase characters, as can be seen in *Stempel Information* type specimen (figure 3.11, page 64). In chapter 1, a set of criteria was outlined in order to structure typeface evaluations. These are:

- consistency — the proportions of characters in relation to each other, and includes alignment, spacing, kerning, the positioning of diacritics, and stroke modulation,
- readability — the quality of visual comfort when reading a body of continuous text,
- balance or harmonisation between the Greek and Latin Caledonia.

Where relevant, references are made to the extant proofs, illustrations, and individual characters from different stages of the design process which are laid out in tables 1-4 (see

¹³⁸ Arthur H. Walker to Mike Parker, 'Helvetica Greek', 7 April 1971. File 20, Greek, WTC, DTGC.

1. March 1964	α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ
2. April 1964	α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ
3. July 1965	α	β̂β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ
4. Final version	α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ
5. Caledonia Latin	o		y	o			n		i	k	y	u

1. March 1964	ν	ξ	ο	π	ρ	σ	τ	υ	φ	χ	ψ	ω
2. April 1964	ν	ξ	ο	π	ρ	σ	τ	υ	φ	χ	ψ	ω
3. July 1965	ν	ξ	ο	π	ρ	σς	τ	υ	φφ	χ	ψ	ω
4. Final version	ν	ξ	ο	π	ρ	σς	τ	υ	φ	χ	ψ	ω
5. Caledonia Latin	v		o	i	o	o	t	u		x		

Tables 3 and 4. The first three rows show the design evolution of each Caledonia Greek lowercase character across the three proofs that were issued — the first two show Mergenthaler’s design whilst the third shows the characters designed by Grigoris Asteriades. The fourth row shows the final iteration of Caledonia Greek as seen in Linotype’s specimen of Greek typefaces for photocomposition (figure 3.11, p.64). The fifth row shows the Latin Caledonia’s lowercase characters in order to demonstrate the formal similarities between the Latin and Greek lowercase alphabets.

pages 66 and 68). The evaluation does not discuss the bold and italic styles of the typeface as there is scant archival information as well as visual material on these. In order to provide additional context for the evaluation, Appendix A contains a short survey of the typographic features of the Greek script.

For the most part, uppercase characters appear to have had minimal revisions throughout their development, and common characters between the Greek and Latin scripts were retained from Caledonia (tables 1 and 2, page 66). Only nine uniquely Greek characters would have had to be designed to complete the character set — gamma (Γ), delta (Δ), theta (Θ), xi (Ξ), sigma (Σ), phi (Φ), psi (Ψ), and omega (Ω). However, they would not have been designed from scratch given the formal similarities between the two scripts, as tables 1 and 2 demonstrate. Of all the characters, xi (Ξ) has had the most obvious amendment; unusually it started out with a vertical stem which was subsequently removed as the middle horizontal stroke became more proportional (table 2, page 66). The relationship of the stem thickness to the counter size of the Greek characters is broadly consistent, except for the counter space in phi (Φ) which looks narrow in comparison to other characters, such as theta (Θ) or omicron (O). Nonetheless, as the Greek uppercase characters have remained very close to the Latin Caledonia's, there is a certain amount of harmonisation between these two character sets.

The lowercase alphabet was significantly modified from its original design, although there are no visible differences in the forms of individual characters in the first two proofs. Considerable modifications occur in the third proof, where a significant number of characters are more cursive or have acquired variant forms as a result of Asteriades's redrawing of the lowercase alphabet (table 4, third row). There is generally a higher contrast between the thin and thick strokes than in the previous iterations. The final iteration of the lowercase (table 4, fourth row) retains many of the design features as well as the high contrast seen on the third proof as a result of Asteriades's continuous development. A major difference from the third proof is the removal of the serifs in a number of characters. There are also inconsistencies in the terminals of the descenders of some characters: some terminals are rounded off whilst others are square-shaped. Examples of this can be seen in eta (η) and mu (μ). Some lowercase Greek characters also have similarities with Caledonia's lowercase, such as iota (ι), lambda (λ), and nu (ν) (tables 3 and 4).

Visually, the result is unconventional; the characters' design moves further away from the original Latin, in an effort to incorporate some of the inherent cursiveness of the Greek script, whilst still retaining some of the Latin squareness. This idiosyncratic hybrid does not aid the legibility of the characters, and there is no real relationship between the Greek and Latin lowercase sets of Caledonia (tables 3 and 4). The high contrast makes the typeface appear light on the page, and does not aid its readability. This makes Caledonia Greek unsuited to newspaper text setting where low contrast typefaces are preferred as they work well in small sizes, and are able to withstand the demands of the newspaper printing environment better.

3.4 Conclusion

Caledonia Greek was a design intended as a text face for newspaper composition in the Greek printing market. Its development was initiated just before Linotype began focussing intently on the development of phototypesetters, as well as an ambitious programme of type development, in order to expand to new printing markets. With the design of Caledonia

Greek, Linotype aimed to address the lack of quality and variety of Greek text faces, and to compete more effectively in newspaper matrix sales with Intertype in the Greek printing market. From the start, the project was beset by delays and ultimately lost momentum as Mergenthaler prioritised other work. The transfer of the responsibility for the project from Mergenthaler to L&M, whilst their agent Costas Chryssochoides was in charge of its art direction, did not smooth the design process of the development which went through a number of revisions. Therefore, the lack of art direction, leadership as well as research into Greek typographic tradition contributed to numerous character modifications which significantly delayed the completion of Caledonia Greek's development. The result was an unconventional, high-contrast typeface particularly unsuitable for newspaper text setting, bearing a number of design inconsistencies that would have impacted its performance in print. As a result, Caledonia Greek did not have the anticipated commercial impact in the Greek printing market.

The following chapter examines the arrival of Linotype photocomposition technology in Greece in 1970. By then, Linotype's typeface development programme was firmly in place, and the company was looking to enter the nascent Greek photocomposition market. Based on archival sources and interviews, the chapter examines the circumstances which led to its first installation at the Athens Publishing Center in order to investigate Linotype's commercial expansion in phototypesetting in Greece.

4 Linotype, the Athens Publishing Center and the nascent photocomposition market in Greece

This chapter examines how the installation of the Linofilm Super-Quick phototypesetter at the Athens Publishing Center (APC), the printing company founded in 1966 by the urban planner Constantinos Doxiadis, facilitated Linotype's efforts to enter the nascent photocomposition market in Greece. The chapter is divided into two sections: section 4.1 examines the reasons that prompted the launch of APC to highlight the events that led to the installation of the first Linotype phototypesetter in Greece,¹³⁶ and to the company's ensuing relationship with Linotype; and section 4.2 considers the installation of the Linofilm Super-Quick in order to call attention to the significance of the event both for the Athens Publishing Center and Linotype. The section is followed by a conclusion to the chapter.

4.1 The launch of the Athens Publishing Center

The Athens Publishing Center was a printing company founded by the eminent urban planner Constantinos Doxiadis¹³⁷ in 1966.¹³⁸ Doxiadis had already set up Doxiadis Associates (DA), a successful urban planning and development consultancy with an international clientele, in 1951. DA was quickly followed by the setting up of a number of other affiliated businesses, of which APC was one. Together they formed the Doxiadis Organization (DO).¹³⁹ Doxiadis's professional activities generated a large volume of printing that included project reports and bulletins, the journal *Ekistics*, the company newsletter *DA Review*¹⁴⁰ as well as a number of books on urban planning by Doxiadis himself.¹⁴¹ Moreover, as the scope of Doxiadis's work was international and the use of English alongside Greek was an essential part of DA's office culture,¹⁴² a large number of DO's publications required English-language or bilingual text setting.

Although there had been a printing service at the DA office, it was too limited to accommodate the Organization's increasing printing requirements, and had no in-house typesetting facilities. As a result, most printing jobs were distributed amongst various printers and typesetters around Athens;¹⁴³ for example, the sixteen pages of the monthly,

136 Carter, Matthew, 'Which Came First, the Greeks or the Romans?', in *Greek Letters: From Tablets to Pixels*, ed. by M.S. Macrakis, (Delaware: Oak Knoll Press, 1996), 197.

137 For biographical information, see Appendix B.

138 Doxiadis, Constantinos, internal memo, 'Ίδρυση μονάδας γραφικών τεχνών' ['Establishment of graphic arts unit'], 27 April 1966. "Signs by C.A. Doxiadis (SD-DC) Concerning Doxiadis Organization activities (1965-1971)", (Archive Files 19025), CADA.

139 Kirtsis, A. A., 'Εισαγωγικό σημείωμα', in *Κωνσταντίνος Α. Δοξιάδης, Κείμενα, σχέδια, οικισμοί*, ed. by A. A. Kirtsis [*Constantinos A. Doxiadis. Texts, designs, settlements*], (Athens: Ikaros, 2006), 9.

140 The newsletter was produced in English and aimed 'to communicate official and general information, including all facets of personnel activities such as travels, speeches, public appearances and guests'. Its distribution included all other international DA offices, collaborators, clients and friends. See *DA Review*, 'New look for DA house organ on ten year anniversary', 67.6 (1970), 2, CADA.

141 For a description of the design of DO publications, see chapter 5. For Doxiadis's theory of *Ekistics* and some of the main publications he produced on *Ekistics*, see Appendix C.

142 Filippidis, Dimitris, *Κωνσταντίνος Α. Δοξιάδης (1913-1975). Αναφορά στον Ιππόδαμο*. [*Constantinos A. Doxiadis (1913-1975). Report to Hippodamus*], (Athens: Melissa, 2015), 81.

143 Doxiadis, 'Ίδρυση μονάδας γραφικών τεχνών' ['Establishment of graphic arts unit'], CADA.



Figure 4.1. View of the printing facilities at the Athens Publishing Center. Undated. CADA. 191% of original size.

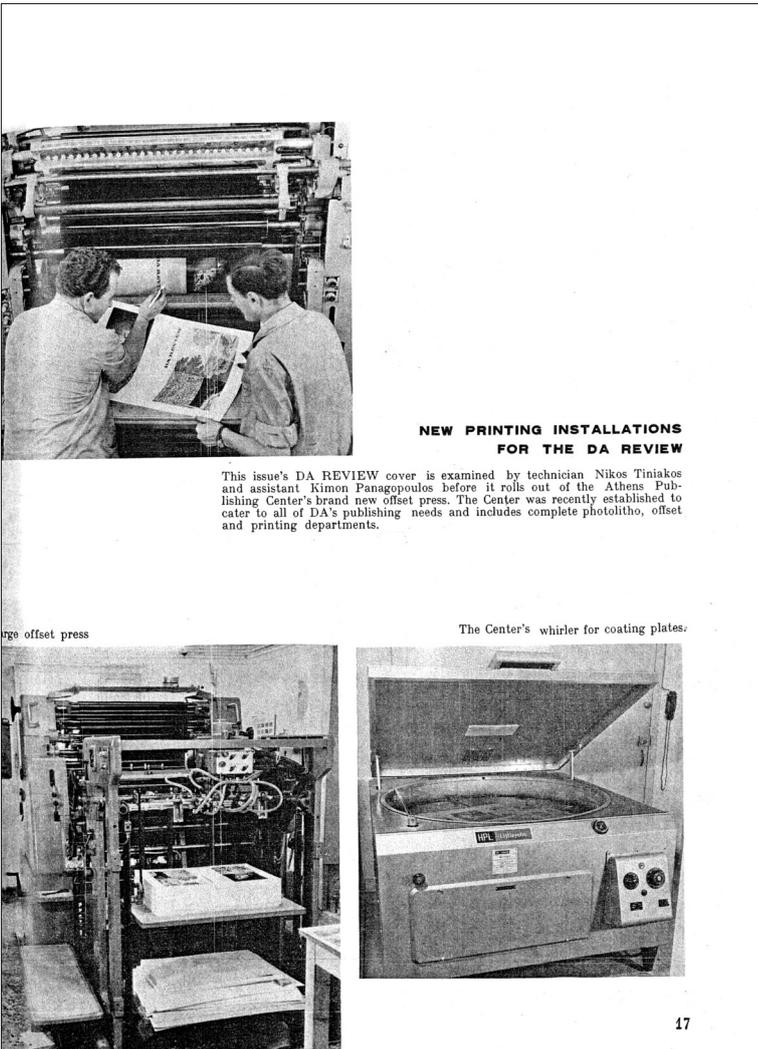


Figure 4.2. Article from the *DA Review* in October 1966 announcing the new printing installations at the Athens Publishing Center. The pictures feature some new equipment such as the Nebiolo offset press (top) and the Littlejohn whirler for coating plates (bottom right). From *DA Review*, 2.22 (1966), 17. CADA. 53% of original size.

English-language *DA Review* were set by hand by two compositors who had no knowledge of English, and printed on an outdated letterpress machine used for teaching purposes at the Doxiadis School.¹⁴⁴ At the same time, *Ekistics*, also a monthly publication, was produced at a printing workshop with a Monotype installation.¹⁴⁵ It was apparent to Doxiadis that the lack of appropriate in-house printing facilities was a hindrance: the production of DO publications by different typesetters and printers was a time-consuming and costly process. Moreover, the results, in terms of quality, were variable.¹⁴⁶ Nicholas Avronidakis, who was APC's Managing Director from 1966 until 1978, recalled that it had been Doxiadis's idea to form a market-oriented printing and publishing company which could also handle the printing and typesetting of all DO publications.¹⁴⁷ Doxiadis's office memo announcing the founding of APC in 1966 stated the reasons that prompted its launch:

Our experience at DA, as well as in all its affiliated companies, has shown that our efforts in the field of printing have been dispersed across many specialised printing shops, in many places around the city, in addition to the DA central printing service, which can only offer limited services. This process was time consuming as well as costly.¹⁴⁸

Therefore the drive behind the founding of APC was to have a fully-equipped in-house printing facility in order to centralise the production of all DO publications, thus achieving control over the printing process and ensuring a consistent printing quality. Furthermore, APC was not going to be merely an in-house printing service but a commercial printing company offering its services to the wider Greek printing market. In the same memo, Doxiadis stated that:

The new unit, by purchasing large up-to-date offset and photolithographic presses, in addition to the existing machines it will inherit from DA, will be able to serve quickly and with competitive prices all our printing requirements. More specifically, the new unit will be able to undertake, by itself or (on occasion) in conjunction with other printing businesses, the following: typesetting and printing (texts, invoices, etc.), OFFSET printing (litho printing of texts, photographs, plans, etc.), photolithographic jobs (reductions, enlargements), reproduction photography, Gestetner printing, bookbinding, photocopying.¹⁴⁹

Doxiadis's references to APC working in conjunction with other printing businesses as well as its 'competitive prices' is an indication that the Center was expected from the beginning to stand on its own feet financially. This was true for all affiliated companies under the DO umbrella. In fact, Doxiadis considered APC one of the most promising of all DO businesses: in his view, it had the potential to further expand its services as well as make large profits.¹⁵⁰

Following Doxiadis's announcement, it took time for APC to acquire all the necessary equipment. Initially, APC was able to offer only offset printing (figure 4.1). A Nebiolo offset

¹⁴⁴ Avronidakis, Nicholas, email interview, Athens, Greece, 14 June 2017.

¹⁴⁵ Ibid.

¹⁴⁶ Papanikolaou, Tania, email interview, Athens, Greece, 19 July 2017.

¹⁴⁷ Avronidakis, email interview, 14 June 2017.

¹⁴⁸ Doxiadis, 'Ίδρυση μονάδας γραφικών τεχνών' ['Establishment of graphic arts unit'], CADA. Author's translation.

¹⁴⁹ Ibid. Author's translation.

¹⁵⁰ Filippidis, 247.

The Athens Publishing Center's new phototypesetting installation. From right to left: keyboard operator T. Tsimidopoulou, G. Varanakis at automatic film processor, and DA Review's editor C. Natsis trying out the keyboard of a perforating machine.



Figure 4.3. The installation of the Linofilm Super-Quick at APC shows the different units that comprised the phototypesetting system. On the right, the keyboard operator is T. Papanikolaou (née Tsimidopoulou), manager of the photocomposition department at APC, G. Varanakis is by the film unit at the back, and C. Natsis, editor of the *DA Review*, sits at the keyboard of the perforating machine on the left. CADA. 77% of original size.

press, purchased from Costas Chrysochoides,¹⁵¹ was used in the first instance but proved to be unreliable. It was followed by a Heidelberg which significantly improved the quality of APC's offset production. According to Avronidakis, it was also not long before APC acquired whirlers from Littlejohn for the preparation of printing plates (figure 4.2), a drum scanner for colour separations from Crosfield Electronics, and a Klimsch camera for the high quality reproduction of photographs, maps, and architectural and construction plans.¹⁵² Although APC had managed to expand its infrastructure and obtain new equipment, there was still no in-house typesetting facility. As late as 1969, three years after its launch, APC's requirements for text composition were still being outsourced to external suppliers.¹⁵³

4.2 The installation of the Linofilm Super-Quick phototypesetter

At a time when phototypesetting, and indeed computers, were gradually becoming an integral part of the printing process, APC's management felt that they could not consider hot-metal systems but rather needed to explore other, more up-to-date processes. Nicholas Avronidakis had heard a lot about Compugraphic's phototypesetters from an American friend in the newspaper industry. It was therefore decided that a phototypesetting system from a trusted company was a necessary addition to a fully-equipped printing business. In view of this, a proposal from Costas Chrysochoides 'to provide an elegant and modern phototypesetter' from Linotype found fertile ground.¹⁵⁴ It has not been possible to determine from archival sources or interviews when Chrysochoides made his proposal. However, Linotype correspondence suggests that Avronidakis had been considering the purchase of a phototypesetter for some time: he had been in contact with Linotype on that matter some four or five years prior to 1969.¹⁵⁵ Additionally, Sophia Zarabouka, the in-house designer at DO, confirmed that Constantinos Doxiadis himself had taken an active interest in photocomposition as early as 1961 at a time when most of the Greek printing trade was largely unaware of the new technology.¹⁵⁶

The phototypesetter that Avronidakis was considering in 1969 was the Linofilm Super-Quick that Mergenthaler had produced the year before. The company had had a slow start in the development of phototypesetters. Its first efforts had been largely unsuccessful, however the launch of the Linofilm Quick in 1964 followed by the Linofilm Super-Quick four years later had met with moderate success.¹⁵⁷ One of the fastest phototypesetters at the time, the Linofilm Super-Quick had an output speed of 40 characters per second. It was a second-generation photomechanical typesetter which set text by projecting images of photographic masters onto photosensitive film or paper. The device had two units: the photo unit and the keyboard unit (figure 4.3). The storage of the characters of a typeface were in glass grids. The device's optical system illuminated selected characters whilst masking out the rest with a series of wedges. The composition of copy was done at the keyboard unit by an operator.

¹⁵¹ Chrysochoides represented Nebiolo as well as Linotype in Greece.

¹⁵² Avronidakis, email interview, 14 June 2017.

¹⁵³ Albert Salt to Mike Parker, 'Athens Publishing Center, Athens, Greece', 29 December 1969. File 20, Greek, WTC, DTGC.

¹⁵⁴ Avronidakis, email interview, 14 June 2017.

¹⁵⁵ Albert Salt to David Tyrwhitt-Drake, 'Athens Publishing Center, Athens, Greece', 22 October, 1969. File 30, Photocomposition, WTC, DTGC.

¹⁵⁶ Zarabouka, personal interview, 27 May 2017.

¹⁵⁷ Romano, Frank, *History of the Linotype Company*, (Rochester: RIT Press, 2014), 267.

The output was both a typewritten proof copy and an 8-channel perforated paper tape. The tape was read into the photo unit which then built up the line copy by successive sequential photographic projection of characters in the line. The output from the Super-Quick was right-reading positive film.¹⁵⁸

Avronidakis had already seen the Linofilm Super-Quick in printing trade shows in Paris and Milan,¹⁵⁹ but wanted an opportunity to see it in operation in order to make up his own mind as to its capabilities and suitability for APC.¹⁶⁰ On 9 October 1969, he paid a visit to the offices of the newspaper *Essex Chronicle*¹⁶¹ in Chelmsford, Essex, to view a demonstration of the machine, which had been the first installation of its kind in Britain¹⁶². The visit was arranged by Albert Salt, General Sales Manager for Europe at MINT, and Avronidakis was conducted to the newspaper by David Tyrwhitt-Drake, the technical sales representative for Linotype & Machinery.¹⁶³ According to Salt, the demonstration was ‘first class’.¹⁶⁴ Linotype was keen to establish links with APC; selling a phototypesetter to a reputable Greek printing company with a prestigious clientele presented Linotype with an opportunity to enter the nascent photocomposition market in Greece. As was discussed in chapter 2, this was at a time when few Greek printing businesses would have been able to afford the transition from hot-metal to photocomposition. Nonetheless, the Greek economy was experiencing a certain amount of economic growth, and, as Costas Makris had observed, the market was ‘open to minicomputer systems and applications’ (see 2.4). Albert Salt had also recognised the potential to increase sales of Linotype photocomposition machines. He described APC to Mike Parker, Director of Typeface Development at Mergenthaler, thus:

[...] They [APC] print magazines, books, catalogs, instruction manuals both for their parent company and under contract. They intend to offer film setting to the trade in Greece and in France. The quality of their work is very good and they are building up a fine reputation. Plans for the Composing Department are most interesting and I am quite certain that if the first Super-Quick is a success there will be two more within 12 to 18 months. The majority of their composition is purchased outside and it is because of the bad quality supplied that the Athens Publishing Center have turned to photocomposition. [...] I am quite convinced that we shall establish photocomposition in Greece by working with this company — they have prestige, and the Doxiades family is well-connected with the Greek Government — all Governments, past and present — the reason being the amount of foreign exchange they earn for the country. [...] These people [APC] are well connected with the Universities and with Greek Scholars and they can be of tremendous assistance to you.¹⁶⁵

Constantinos Doxiadis was exceptionally well-connected. His father had been a prominent

¹⁵⁸ Seybold, 85-89.

¹⁵⁹ David Tyrwhitt-Drake to E.S. Emery and Walter Tracy, report, ‘DJTD/JQ. Nicholas Avronidakis – Manager, Athens Publishing Center Graphic Arts Co. Ltd., 39, Demokritou Street, Athens 136’, 20 October 1969, File 30, Photocomposition, WTC, DTGC.

¹⁶⁰ Nicholas Avronidakis to David J. Tyrwhitt-Drake, 16 October 1969. Folder 30, Photocomposition, WTC, DTGC.

¹⁶¹ The *Essex Chronicle* is a weekly regional newspaper originally founded as the Chelmsford Chronicle in 1764 in Chelmsford, Essex. See The British Newspaper Archive <<http://www.britishnewspaperarchive.co.uk/search/results?newspaperTitle=Chelmsford%20Chronicle>> [accessed 2 November 2015].

¹⁶² Wallis, L.W., *A Concise Chronology of Typesetting Developments, 1886-1986*, (London: The Wynkyn De Word Society, 1988), 38.

¹⁶³ *Linotype Look*, ‘Appointments. David Tyrwhitt-Drake’, 1 (1973), 7. WTP, Box 5, SBL.

¹⁶⁴ Albert Salt to David Tyrwhitt-Drake, ‘Athens Publishing Center, Athens, Greece’, 22 October, 1969.

¹⁶⁵ Albert Salt to Mike Parker, ‘Athens Publishing Center, Athens, Greece’, 29 December 1969.



Figure 4.4. 'Synthesis using phototypeset letters'. The cover of the July 1970 issue of the *DA Review* proclaiming the new look of the publication as a result of the adoption of photocomposition. The cover features the perforated tape of the Linofilm Super-Quick as illustration, and it is typeset in Helvetica, Optima and Sabon. The typefaces were part of the installation of the machine. *DA Review*, 67.6 (1970), cover. CADA. 44% of original size.

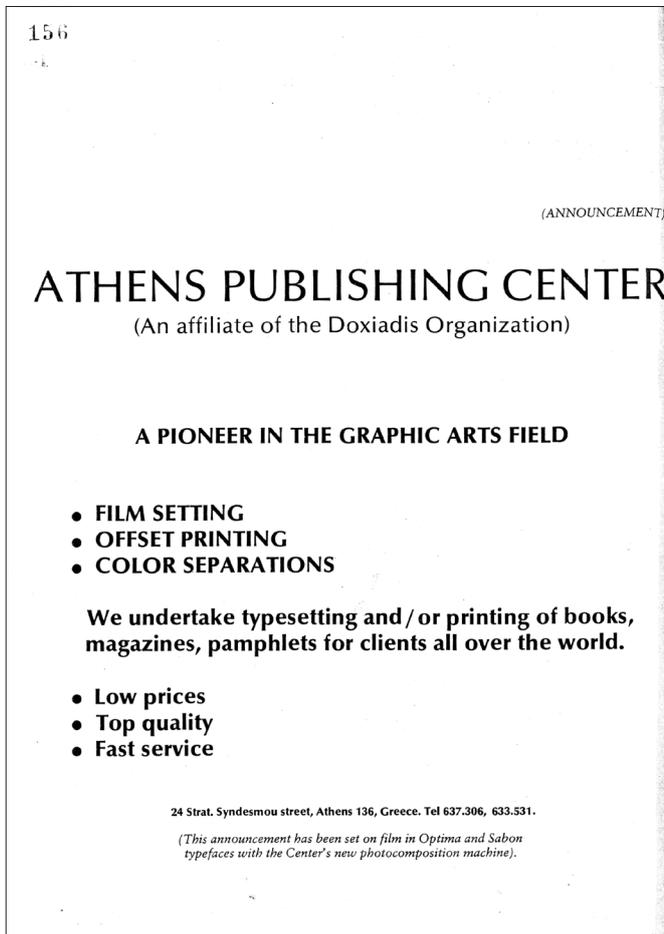


Figure 4.5. Facsimile of the back cover of the August 1970 issue of the *DA Review* announcing APC's typesetting and printing services to an international audience. At the bottom, text indicates that the announcement has been set on film in Optima and Sabon by the Linofilm Super-Quick. *DA Review*, 68.6 (1970), back cover. CADA. 46% of original size.

paediatrician and liberal politician who had served as Minister of Public Health and Social Welfare in the 1920s. Doxiadis himself had a distinguished track record in high-ranking positions pertaining to regional and town planning in the Greek civil service for more than a decade, and had been one of the primary leaders of the postwar reconstruction of Greece. His work with DA was closely linked with the initiatives of the United Nations and the World Bank, and included national housing programmes, the development of towns and villages, agriculture and irrigation projects and centres of commerce and tourism worldwide. Some of the biggest projects his consultancy undertook as lead architects were the planning of Islamabad, the capital of Pakistan, and the development of housing programmes in the United States which aimed to encourage the regeneration of American cities. He had connections not only in the Greek political, academic and cultural establishments but also in corresponding influential circles worldwide.¹⁶⁶

Soon after the demonstration at the *Essex Chronicle*, Salt received an invitation to visit APC in Athens in order to discuss the possible sale of a Linofilm Super-Quick,¹⁶⁷ and in February 1970 Mike Parker confirmed to Walter Tracy the order from APC.¹⁶⁸ Avronidakis said that it was the first and only phototypesetting machine to be used by APC, and he presumed that it was also the first of its kind in Greece.¹⁶⁹ The type designer Matthew Carter, who designed Helvetica Greek for APC's Super-Quick and met Avronidakis (see chapter 5), had the same view.¹⁷⁰ Moreover, during the GEC trade show in Milan in October 1969, a reporter from the trade journal *Η Τυπογραφία* (*The Typography*) visited Linotype's exhibition stand and interviewed Costas Chrysochoides about the technical specifications of the Linofilm Super-Quick and Linotron 505 phototypesetters. The subsequent report covering the trade show in the journal's issue 250 in December 1969 refers to the sale of a Linofilm Super-Quick to a printing business in Greece.¹⁷¹ Therefore, it appears that the order for the machine was placed very quickly after Avronidakis's visit to the *Essex Chronicle*, and both Avronidakis's and Carter's recollections are substantiated.

Linotype correspondence records that the Super-Quick was supplied with grids for Helvetica, Optima and Sabon as well as four sizes of Metro Greek, two sizes of Greek No. 3 and one size of Greek No. 1 italic.¹⁷² However, Avronidakis recalled that the machine's variety of typefaces and sizes was limited: there was only a choice of Helvetica, Latin and Greek, and Optima.¹⁷³ It is unlikely that the Super-Quick was equipped with such few typefaces. Firstly, figures 4.4 and 4.5 demonstrate that the phototypesetter was indeed equipped with Helvetica, Sabon and Optima; the cover of the July 1970 issue of the *DA Review* was composed using these typefaces (figure 4.4) whilst an announcement advertising APC's services on the back cover of the following month's issue (August 1970) highlighted the fact that it was 'set on film in Optima and Sabon typefaces with APC's new photocomposition machine' (figure 4.5). Secondly, a complete list of all available typefaces for the Super-Quick can be seen

¹⁶⁶ Kirtsis, 10.

¹⁶⁷ Walter Tracy to Mike Parker, 'Super Quick: Greek', 21 October 1969. File 30, Photocomposition, WTC, DTGC.

¹⁶⁸ Mike Parker to Walter Tracy, 10 February 1970. Folder 20, Greek, WTC, DTGC.

¹⁶⁹ Avronidakis, email interview, 14 June 2017.

¹⁷⁰ Carter, Matthew, 'Which Came First, the Greeks or the Romans?', 197.

¹⁷¹ Methenitis, Georgios, 'Επίσκεψη στο εκθετήριο της Linotype' ['A visit to the Linotype exhibition stand'], *Η Τυπογραφία*, Issue 250, Saturday 31 December 1969, 19.

¹⁷² Mike Parker to Walter Tracy, 'Greek for Linofilm Quick', 16 December 1969. File 30, Photocomposition, WTC, DTGC.

¹⁷³ Avronidakis, email interview, 14 June 2017.

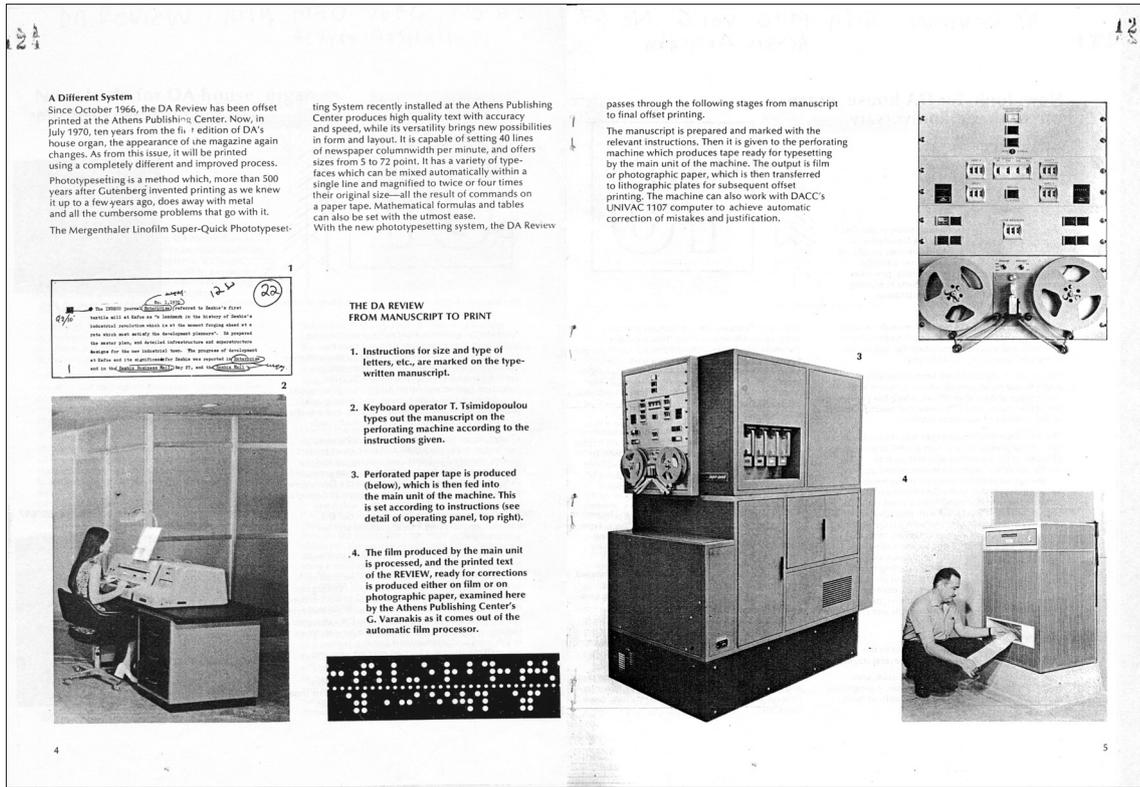


Figure 4.6. Facsimile of pages 4 and 5 from the five-page feature in the *DA Review* announcing the installation of the Linofilm Super-Quick at APC. The spread, set in Optima, describes the function of photocomposition, the installation of the Linofilm Super-Quick, and the stages the *DA Review* went through with the new process from manuscript to film. *DA Review*, 67.6 (1970), 4-5. CADA. 78% of original size.

in APC's in-house type specimen.¹⁷⁴ They were (in the order they are displayed in the type specimen):

- Helvetica Greek (including italic and bold styles)
- Greek No. 3
- Greek No. 1 (italic style only)
- Greek Metrolite No. 2
- Greek Metromedium
- Helvetica (including italic and bold styles)
- Sabon (including an italic style)
- Optima (including a bold style)

As is also shown in 5.1 (see page 93), Avronidakis was critical of the Greek Metro series and Greek No.3; the former proved not to be popular with APC customers and were never used, and the thin strokes of the lowercase characters of the latter were so thin that they disappeared after platemaking.¹⁷⁵ From the remaining typefaces, Greek No. 1 is the italic style that accompanies Greek No. 3, and it is probably unlikely that it was used on its own to set text. As for Sabon, it is possible that either there wasn't much need for it or, as with the Greek Metro series, APC's customers did not prefer it. Therefore, it is possible that Avronidakis recalls a limited variety of typefaces on the Super-Quick simply because APC used Helvetica, both Greek and Latin, and Optima for the majority of their printing output.

The available type sizes are visually displayed with sample text set in each typeface in the APC type specimen (for an illustration, see 5.1, page 114). Additionally, the July 1970 issue of the *DA Review*, which dedicated five pages to the installation, explained that type sizes ranged from 5 to 72 point, and different typefaces could be mixed automatically within a single line and magnified to twice or four times their original size due to the phototypesetter's photographic properties. Moreover, it was possible to typeset mathematical formulas and tables.¹⁷⁶ Therefore, the range of sizes that the Linofilm Super-Quick provided was not limited, although there was an issue of the quality of output at different sizes due to the magnification or reduction of the master sizes.¹⁷⁷ Once more, it is possible that most of APC's printed output required only a handful of sizes, and simply did not need the whole range that the phototypesetter could produce.

Although Avronidakis recalled that the Super-Quick was typographically limited, he did stress that staff at APC were very pleased with the purchase of the phototypesetter.¹⁷⁸ This enthusiasm is reflected in the five-page feature in the July 1970 issue of the *DA Review* which described how the new typesetting process worked and the new possibilities it brought to the design of documents (figure 4.6):

[...] Now in July 1970, ten years from the first edition of DA's house organ, the appearance of the magazine again changes. As from this issue, it will be printed using a completely different and improved process. Phototypesetting is a method, which more than 500 years after Gutenberg

¹⁷⁴ Athens Publishing Center, *Δειγματολόγιο Στοιχείων* [Type Specimen], Archive of Visual Communication in Greece, Athens, Greece.

¹⁷⁵ Robert Pegg to Mike Parker, 'Re: Proposed Layout for Greece', 4 March 1971. Unsorted, LGA, DTGC.

¹⁷⁶ *DA Review*, 'New look for DA house organ on ten year anniversary', 67.6 (1970), 5, CADA.

¹⁷⁷ The enlargement or reduction in size from a master font could distort the type image. Whether this distortion could be seen in print depended on the resolution at which a typeface was digitised and the function of the phototypesetter. See Tracy, 46.

¹⁷⁸ Avronidakis, email interview, 14 June 2017.

invented printing as we knew it up to a few years ago, does away with metal and all the cumbersome problems that go with it. The Mergenthaler Linofilm Super-Quick Phototypesetting System recently installed at the Athens Publishing Center produces high quality text with accuracy and speed, while its versatility brings new possibilities to form and layout.¹⁷⁹

The *DA Review*, the English-language newsletter of DA, was not only distributed amongst staff, but also to clients and all those who were associated with the consultancy. Its purpose was to inform as well as promote the work of DA and other associated activities.¹⁸⁰ As Doxiadis's contacts were not only local but also international, news of the Linofilm Super-Quick installation would have been read potentially by a great number of people, both in Greece and abroad. Given that photocomposition was new at the time, the acquisition of the phototypesetter would have promoted APC as an innovative printing business unafraid to adopt the latest printing technology. The quote above, with its reference to Gutenberg's 500-year-old invention and the claim that photocomposition 'does away with metal and all the cumbersome problems that go with it', implies as much. Moreover, the promotion of the Super-Quick in the pages of the *DA Review* was to Linotype's advantage which benefited from the wider exposure.

Avronidakis also recalled that there were teething problems in the beginning, and APC had no trained technicians to help with the Super-Quick's electronic malfunctions. In fact, on several occasions APC had, with help from Linotype, to recall technicians from other printing shops in Europe in order to rectify faults and help the company back into production. Having the benefit of hindsight and with the awareness of what today's digital technology can achieve, Avronidakis said that the Linofilm Super-Quick was comparatively awkward, slow, unversatile, and with low productivity. Moreover, he felt that the main problem was the machine's perforated paper tape which did not allow for corrections. These had to be typed and output separately on film or photographic paper through the Super-Quick, then cut and pasted into the original text before plates could be made.¹⁸¹

Despite the difficulties, the Linofilm Super-Quick was at the cutting-edge of printing technology in the late 1960s and was a step forward for APC. No longer dependent on external printing and typesetting workshops, APC, by having in-house typesetting facilities, achieved a measure of control over the entire printing process. This meant that DO's publications could now be centralised and a consistent printing quality could be ensured. As the above quote from the *DA Review* implies, the Super-Quick would have been more versatile than hot metal regarding text composition; the automatic hyphenation, line justification, text forming and kerning would have had a considerable impact on the layout of APC's printed output allowing a degree of design control that would not have been possible before when publications were typeset externally. This was particularly evident in the design of DO's publications, whose layouts were complex combining text, images, maps, diagrams and plans in different configurations (see chapter 5). Now fully equipped, APC could facilitate their production with a certain degree of flexibility. Finally, APC were able to offer a filmsetting service to the wider Greek and, according to their advertising, international printing market (figure 4.5, page 80) at a time when the use of photocomposition in Greece

179 *DA Review*, 'New look for DA house organ on ten year anniversary', 4.

180 Filippidis, 162-163.

181 Avronidakis, email interview, 14 June 2017.

was very limited.¹⁸² In order to demonstrate the extent to which photocomposition seemed to be out of bounds for many Greek printing businesses, the reporter from *Η Τυπογραφία* (*The Typography*) who interviewed Costas Chrysochoides at the GEC trade show in 1969, also reported on the technical specifications of the Linotron 505 phototypesetter. He described the machine in the following manner:

The phototypesetter that is truly amazing is the Linotron 505, which of course in Greece we will not see even in our dreams. It is a machine with astonishing capabilities for filmsetting production aimed at the very large printing and publishing units operating abroad whose standards are very high.¹⁸³

The installation of the Linofilm Super-Quick at APC was beneficial for Linotype; less than a year later, in January 1971, the company was preparing an order for a Linotron 505 — presumably the first one in Greece — put through by Fotron S.A. Graphic Arts, a printing company also based in Athens and whose owner E. Valasakis had written an article regarding the inferior quality of Greek printing and typesetting in *Η Τυπογραφία* (*The Typography*) in October 1960 (see 2.2, page 25). The Linotron 505 order came at a time when Linotype was completing the design of Helvetica Greek, which was commissioned by Doxiadis and APC to use on the Super-Quick, as part of Doxiadis's design strategy to typographically align DO publications (see chapter 5). During that time, the development of Optima Greek was in its initial stages (see chapter 6). Valasakis also benefited from the type design activity generated between Linotype and APC; the Linotron 505 was installed in June 1971¹⁸⁴ and was equipped with, amongst other typefaces, Helvetica Latin and Greek and their equivalent bold styles, and Caledonia Latin and Greek, also with their equivalent bold styles.¹⁸⁵ Moreover, after finding out that Linotype was considering a Greek adaptation of Optima, Valasakis expressed a desire to have it for the Linotron 505.¹⁸⁶

Overall, the association with APC had a positive outcome for Linotype: by establishing links with a reputable Greek printing company, it was able to promote its phototypesetters and enter the Greek nascent photocomposition market. In less than a year from the Super-Quick installation, Linotype was processing an order for a more powerful, and consequently more expensive, machine, the Linotron 505. Additionally, the design of Helvetica Greek for APC, which is explored in chapter 5, further enhanced the appeal of its phototypesetters and enabled the company to put in place a long-term programme of Greek type design, which is discussed in chapter 6.

4.3 Conclusion

The installation of the Linofilm Super-Quick at APC's premises was a significant event both for the printing company as well as Linotype. It enabled Linotype to establish links with a reputable Greek printing company that had a prestigious clientele as its founder, the

¹⁸² To give an example of the limited use of photocomposition in Greece in the late 1960s and early 1970s, Monotype's customer records, kept at the Type Archive in London, list only two Greek clients with photocomposition installations: G & A Tsiveriotis Co. Ltd. bought a Mark 3 Filmsetter in 1966, and the Military Printing Office purchased a Monophoto 600 Filmsetter in 1974. See 'Greece, Holland, Hungary, Italy', *Monotype Customer Records*, The Type Archive, London, U.K.

¹⁸³ Methenitis, 'Επίσκεψη στο εκθετήριο της Linotype' ['A visit to the Linotype exhibition stand'], Author's translation.

¹⁸⁴ Mike Parker to Robert Pegg, 18 January 1971. Unsorted, LGA, DTGC.

¹⁸⁵ Robert Pegg to Mike Parker, 'Re: Proposed Layouts for Greece', 4 March 1971.

¹⁸⁶ Ibid.

eminent urban planner Constantinos Doxiadis, was exceptionally well-connected in Greece as well as internationally. The installation received exposure in the widely-distributed *DA Review*, indirectly promoting Linotype and its phototypesetting technology. Although few Greek printing companies would have been able to afford the transition from hot metal to photocomposition in the late 1960s, the economic growth the country was experiencing meant that the market was open to minicomputer systems and applications. This confluence of factors gave Linotype the opportunity to enter the nascent Greek photocomposition market; in less than a year after the installation of the Super-Quick at APC, the company had an order for a more powerful and more expensive machine, the Linotron 505.

For APC, this installation also had several benefits: the acquisition of the phototypesetter promoted the company as an innovative printing business, willing to adopt the latest printing technology; in-house typesetting facilities allowed APC to become a fully-equipped printing business with control over the entire printing process which in turn enabled a consistent printing quality in the production of DO publications; the machine's automation enabled a degree of design control which would not have been possible before; and, the company was able to offer a filmsetting service at a time when the use of photocomposition in the Greek printing market was very limited.

The following chapter examines a different facet of the relationship between Linotype and APC. In particular, it focusses on Doxiadis's engagement with typography and the complex design of DO's publications, and how these factors led to the commissioning of Helvetica Greek.

5 The design of Helvetica Greek

This chapter investigates the design of Helvetica Greek, which was commissioned by APC to be used specifically on the Linofilm Super-Quick, thus continuing the company's working relationship with Linotype. It was the first typeface designed as part of Linotype's programme of Greek type design specifically for photocomposition, which aimed to enhance the sales of phototypesetters in the Greek printing market. The chapter consists of five sections. More specifically, section 5.1 examines the publications that the Doxiadis Organization (DO) produced, with a particular emphasis on Constantinos Doxiadis's design strategy, and how the installation of the Linofilm Super-Quick and the commission of a new exclusive sans serif typeface related to this. The development of the design brief, and its relation to both APC's and Linotype's business strategies, is examined in section 5.2. The development of Helvetica Greek is explored in section 5.3 whilst an evaluation of the design is provided in section 5.4. The conclusion to the chapter is in section 5.5.

5.1 The publications of the Doxiadis Organization

According to Tania Papanikolaou, who managed the phototypesetting department at APC at the time, the Linofilm Super-Quick significantly improved APC's print production and allowed the company to respond to increased market demands, both in terms of quantity as well as quality. After the installation of the Super-Quick, APC was a small- to medium-sized company employing 25 people, nine of whom worked in the phototypesetting department. The company's external clients reflected its size, capacity and prestige: the Greek National Gallery, other art galleries and governing authorities, pharmaceutical companies, book publishers as well as private clients. The type of work APC undertook ranged from medical textbooks, corporate literature and advertising ephemera to art catalogues and books.¹⁸⁴ Moreover, in addition to fulfilling DO's printing requirements, APC printed books published by Lycabettus Press, DO's publishing arm which had been launched concurrently with APC.¹⁸⁵ Lycabettus Press employed only five people.¹⁸⁶ Its activity was largely based around Doxiadis's interests in the arts, archaeology and architecture, and its first publications were a series of archaeological travel guides designed by DO's in-house designer, Sophia Zarabouka. She was responsible for a diverse range of work that included the design of all its corporate literature such as journals, newsletters, stationery, and posters. She also designed DA's project reports, its corporate visual identity as well as the identities of the numerous companies that operated under the DO umbrella.¹⁸⁷

The project reports were especially challenging to produce. They were multi-page, bilingual documents with high production values, and they were central to Doxiadis's

¹⁸⁴ Papanikolaou, email interview, 19 July 2017.

¹⁸⁵ Kabouri, Maro, personal interview, Athens, Greece, 28 June 2017.

¹⁸⁶ Ibid. They were the graphic designer Sophia Zarabouka, Maro Kabouri, who had administrative duties and occasionally copy edited, Kali Doxiadi, one of Doxiadis's daughters, and her husband John Chappel, and Lena Papaligoura.

¹⁸⁷ Zarabouka, personal interview, 27 May 2017.



Figure 5.1. Covers of the *DA Review* mounted on board. The visual look and feel of the newsletter is rationalised and adhered to, and the cover images display variety. Undated. CADA. 220% of original size.



Figure 5.2. Covers of reports, newsletters and the *Ekistics* journal produced by the Doxiadis Organization. There is a limited use of typefaces on the covers and a preference for sans serif over serif typefaces. Undated. Mounted on board. CADA. 226% of original size.

work with DA; they detailed the work process on individual urban planning projects, and were routinely given to clients and other stakeholders during Doxiadis's presentations. Typically, their print run was limited to between 10 and 20 copies at any one time. Zarabouka painstakingly handled every detail of their design, from the bilingual typesetting to the page layout and the cover design. Moreover, large architectural and construction plans as well as diagrams had to be significantly reduced, and images were often retouched by hand — both processes that were laborious and time-consuming.¹⁸⁸

Examples of some the publications that Zarabouka produced for DO and Lycabettus Press can be found at the Constantinos A. Doxiadis Archive in Athens. Overall, the visual look and feel of the covers of publications — i.e., newsletters, reports, journals, books, etc. — is rationalised and adhered to in the manner that corporate publications of large organisations tend to be produced today (figures 5.1 and 5.2). However, they also display a pleasing variety as well as a clean, modern and functional look influenced by the Swiss Style, the leading typographic model during the postwar period. When illustrated, covers have strong colour contrasts as well as a variety of imagery ranging from photographs to illustrations (executed by Zarabouka herself) and diagrams, and there is integration of the imagery and the text (figure 5.3, next page). A limited number of typefaces are used, and the typography is prominent. A preference for sans serifs, such as Futura, over serifs is noted (figure 5.2). Typefaces used for body text vary: the Elzevir-influenced Greek No. 3 is used for the archaeological travel guides whereas some of Doxiadis's own books, which are printed in English, employ Optima with Helvetica for captions — both typefaces imparting a more modern look to the text pages compared to the text pages of the guides. Although the Linofilm Super-Quick was supplied with Greek Metrolite and Metromedium (see 4.2) — the closest to a modern Greek sans serif typeface that Linotype could provide APC at the time — these do not appear to have been used on any of the DO or Lycabettus Press publications that were examined at the Doxiadis Archive. In a letter dated 4 March 1971, Robert Pegg, an engineer in the Graphic Systems Division of Linotype-Paul¹⁸⁹, explained to Mike Parker that the Greek Metro typefaces on APC's Linofilm Super-Quick had never been used:

This customer [Nicholas Avronidakis] is most critical of his two Greek faces — [Greek] No. 3 and Metro. The latter has not proved popular with his customers and has never been used.¹⁹⁰

Prior to the installation of the Linofilm Super-Quick at APC, Zarabouka had felt that the lack of quality of the available Greek typefaces for hot metal was an ongoing problem, particularly in the typesetting of the project reports. Having a well-developed sensitivity to letterforms, she felt that Greek typefaces were not as well-designed as the Latin ones. More specifically, she thought that the design of the Greek lowercase characters was especially problematic. As already mentioned in 2.3, in order to reduce what she anticipated

¹⁸⁸ Ibid.

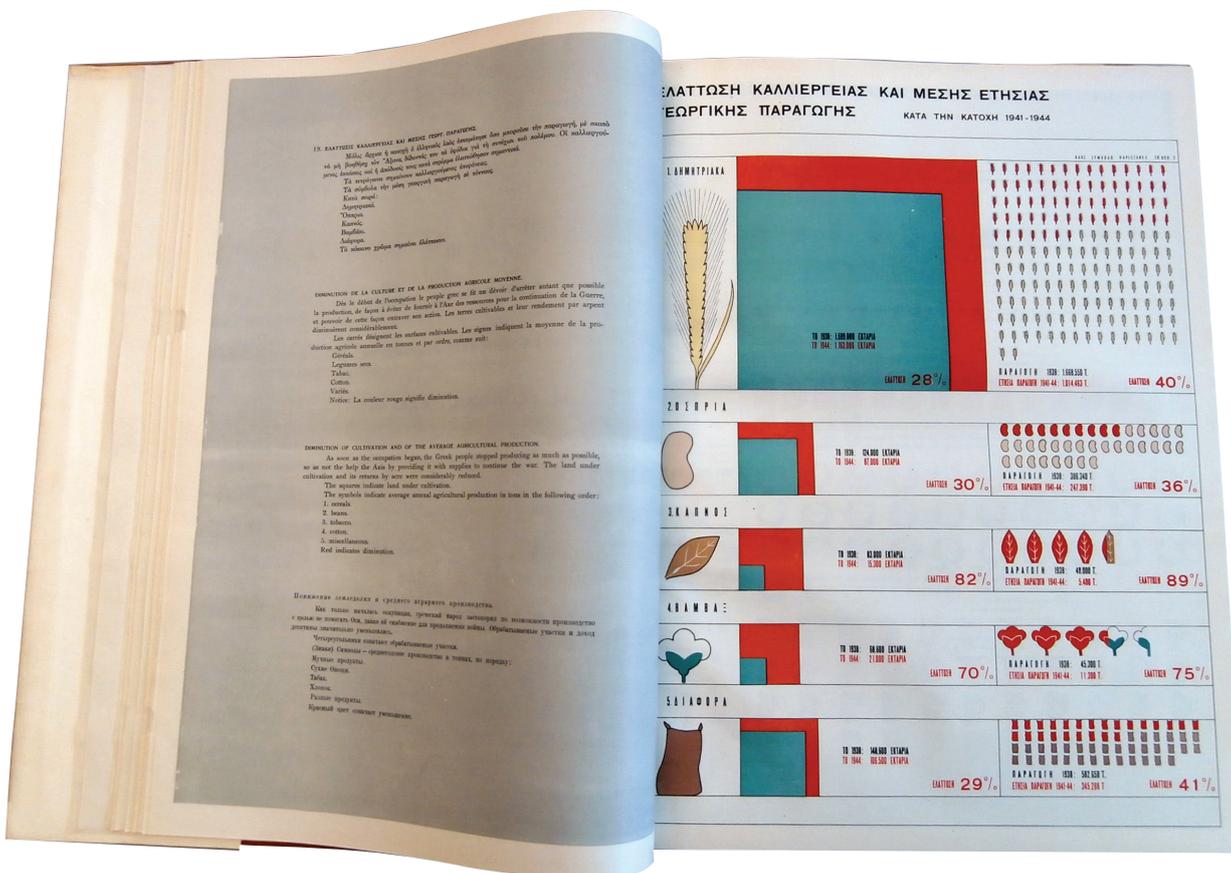
¹⁸⁹ Linotype-Paul was part of the British branch of Linotype, and was established after the merger of K.S. Paul and Linotype & Machinery (L&M) in 1967. K.S. Paul had been a pioneering company that had supported the development of the PM Filmsetter 1001, the first CRT phototypesetter to be widely used by the printing industry. After the merger, the PM Filmsetter 1001 was renamed and sold as Linotron 505, and Linotype-Paul was relocated in Kingsbury, London. Throughout the 1970s, Linotype-Paul was responsible for the development of a number of third-generation CRT phototypesetters. The original hot-metal factory and R&D group at L&M in Altrincham remained operational, although with minimal staff. It remained a separate entity and no effort was made to integrate it with Linotype-Paul. See Wallis, Lawrence W., *A Concise Chronology of Typesetting Developments, 1886-1986*, (London: The Wynkyn De Word Society, 1988), 38.

¹⁹⁰ Robert Pegg to Mike Parker, 'Re: Proposed Layout for Greece', 4 March 1971.



Figure 5.3. Cover of the Ekistics journal that intergrates text and image. It is designed, including the illustration, by Sophia Zarabouka. CADA. 77% of original size of image.

Figure 5.4. (below) Spread from the report *Αι θυσίαι της Ελλάδος στον Δεύτερο Παγκόσμιο Πόλεμο (The Sacrifices of Greece in the Second World War)* documenting data regarding the reduction in the agricultural cultivation during the period of the German occupation, 1941-1944. The pictorial language used is visibly influenced by Isotype. Courtesy of Gerry Leonidas. 84% of original size of image.



to be a negative comparison of the Greek compared to the Latin letterforms, she often placed the two scripts on separate pages. Although she frequently made use of Letraset's Greek typefaces for titles and headings, she found their design quality equally lacking. Her excellent working relationship with Doxiadis meant that she was able to talk to him at length about the typographic quality of DO publications, and draw attention to any problems that interfered with it. These conversations sparked wider reflections about the design of Greek typefaces, and Doxiadis was not only understanding but also willing to look into solutions that would improve the typographic look and feel of his publications.¹⁹¹

Although Doxiadis had no direct involvement in the running of APC or Lycabettus Press, both of which were under the overall management and administration of the Doxiadis Organisation, he had clear ideas of what his publications ought to look like. From the beginning of his career, the production of documents had been an important part of his professional activities. They helped with the dissemination of his ideas on aspects of urban planning — most notably his development of the Ekistics theory (for details see Appendix C) which spurred the launch of the *Ekistics* journal — but were also a means of self-promotion.¹⁹² As Head of the Department of Regional and Town Planning at the Ministry of Public Works he produced the report *Αι θυσίαι της Ελλάδος στον Δεύτερο Παγκόσμιο Πόλεμο* (1946),¹⁹³ which included the documentation of statistical data on the financial, social, health and structural devastation suffered in Greece throughout the Second World War. The report was a significant piece of work: as a factual resource which employed scientific principles, it facilitated a concrete understanding of the scale of the devastation; and it demonstrated Doxiadis's awareness and engagement with the ideas of the modern movement in the twentieth century, and in particular with the ideas of the Vienna Circle.¹⁹⁴ More specifically, the report was produced as a large hardbound document, where the statistical data was innovatively presented by employing a pictorial language heavily influenced by Isotype, which was the work of a key member of the Vienna Circle, Otto Neurath (figure 5.4).¹⁹⁵ It was typeset in four different languages — Greek, French, English and Russian — using a plain combination of sans-serif typefaces for headers and subheads, and serifs for the body text, all placed on a formal grid. The overall effect is of an impressively modern report in the way it employs graphic conventions and typography to communicate its information to a wide audience.

The publicity Doxiadis received from the publication of the report was effective as he went on to represent Greece as Minister-Coordinator of the Greek Recovery Programme leading two delegations: the first in 1947 at the United Nations International Conference on Housing, Planning and Reconstruction, and the second in 1949-50 at the Greco-Italian War Reparations Conference.¹⁹⁶ Most importantly, the report demonstrates that Doxiadis

¹⁹¹ Ibid.

¹⁹² Filippides, 161.

¹⁹³ The title translates as *The sacrifices of Greece in the Second World War*.

¹⁹⁴ A group of philosophers and scientists from the fields of natural and social sciences as well as mathematics and philosophy, the Vienna Circle developed logical positivism as a philosophical position during the interwar years in Austria. Logical positivists embraced empirical, scientific thought rejecting philosophical claims to knowledge of facts that could not be presented in language or be subjected to rational enquiry. See Fotion, Nicholas G., (2005). Logical Positivism. In: *The Oxford Companion to Philosophy*. (Oxford: Oxford University Press), 541.

¹⁹⁵ Kirtsis, 348.

¹⁹⁶ Constantinos A. Doxiadis Archive. *Bibliographical note* (2013). <<http://www.doxiadis.org/page/default.asp?la=1&id=10>> [accessed 13 February 2013].

understood early on in his career the value of design in the presentation and dissemination of information to a wide audience.

Whilst working for the Greek Recovery Programme, Doxiadis had also inaugurated a number of weekly and monthly publications that detailed aspects of the country's reconstruction, and he continued this practice with the launch of DA. With regard to the books he authored himself, aside from a desire to make his ideas known, there was also an awareness of their value as objects which could be shared, or sent to selected recipients. For this reason most of his books were produced in sizes that could be posted easily.¹⁹⁷ To this extent, Doxiadis had devised a systematic design strategy for their production. This strategy was demonstrated in a four-page memorandum, dated 1 June 1970, which concerned the standardisation of layouts for his books as well as other DO publications. Addressed to Nicholas Avronidakis as well as two additional DA collaborators, Doxiadis laid out his thoughts on the design of DO printed material based on the collective experience they had all had in the production of publications up to that time. In particular, he was concerned with the following publications: the *Ekistics* journal; the pamphlets of the Athens Centre of Ekistics (ACE) which had between eight and 64 pages and were simply designed and produced; the books of ACE; Doxiadis's own pamphlets and books; DA publications and pamphlets; and publications by DA collaborators or special issues. The size of the publications is the first point of consideration for Doxiadis:

First, it is obvious that all books on Ekistics must be produced in the large format so that the large architectural plans can be displayed properly. Naturally, a question arises how to produce them in pocket size as well (POCKET BOOK EDITIONS). I don't know whether all can be produced in pocket size. This we must try. The bottom line is that ultimately large formats are necessary for all Ekistics books, and for many reasons it would be good to have them in small formats too. It is worthwhile to try and produce some things in small formats.¹⁹⁸

Although Doxiadis does not spell out his reasons for having publications printed in small formats as well, it is likely because, as already mentioned, small formats were easier — and cheaper — to post. Given that Doxiadis's contacts were extensive as well as international, it would be fair to assume that a good number of these publications would be sent to specific people and organisations in this manner.

Following his reflections on format sizes, Doxiadis's memo continued by providing detailed instructions for the standardisation of the page layout by specifying a range of templates. Essentially, there were two templates or 'master' pages; A and B, and each one had variants. Master page A was a standard two-column page for continuous text. Its variants were as follows: A1 was to include chapter headings as well; A2 was to include smaller subheadings within the text; A3 was to be used 'for anything else that may be needed'. Master page B and its variants B1, B2, B3 and B4 were to feature large architectural plans in various configurations; accordingly, either one large plan was to take up an entire page on its own or a number of smaller ones were to be grouped on a page. All of them had to include individual small headings, captions and any keys to symbols in appropriate

¹⁹⁷ Filippidis, 161.

¹⁹⁸ Doxiadis, Constantinos, company memo, 'Σκέψεις πάνω στην τυποποίηση των σελίδων μας' ['Thoughts on the standardisation of our pages'], 1 June 1970, 1-2. General Scientific Matters: Publications through Athens Publishing Center, CADA. Author's translation.

sizes. Doxiadis was evidently well aware that a publication needed to be aesthetically pleasing; he stressed the need for a hierarchy, as well as the correct proportions, amongst all the elements that made up the layout — text, plans, sketches, graphs, tables, captions, etc. — and gave examples from existing publications where the page layout had not been satisfactory. Moreover, he exhibited an awareness that a reader needed to be presented with a varied layout so that a book is not only beautiful but also easy to read.¹⁹⁹

The memorandum was drafted around the time APC took delivery of the Linofilm Super-Quick (see 4.2), and it demonstrates that, after years of having to rely on external suppliers, having an in-house typesetting facility gave Doxiadis the autonomy to plan the design of his publications in earnest. Furthermore, for Doxiadis the design of his publications was clearly important in bringing out their content, and the standardisation of the page layout ensured consistency and clarity of meaning. It has not been possible to ascertain whether this design strategy was also an outcome of his conversations about typography with Sophia Zarabouka. However, it is not unlikely given that she was the sole graphic designer at DO, and by 1970 she had already had extensive experience in designing all manner of publications for the Organization.

Concurrent with the order of the Linofilm Super-Quick, APC began discussions with Linotype for the commission of a custom sans serif typeface to use on the machine. Taking into account the influence of the Swiss Style on the overall look and feel of the publications, a modern sans serif seemed to be an appropriate choice to establish an in-house typographic style. Moreover, as is demonstrated in the following section, APC were looking for a custom typeface they could use exclusively in the Greek printing market.

5.2 The development of the design brief

APC's preference for a new custom typeface was evident as early as Avronidakis's visit to the *Essex Chronicle* in October 1969. In a report to E.S. Emery and Walter Tracy, David Tyrwhitt-Drake, the technical sales representative for Linotype & Machinery who had conducted Avronidakis to the newspaper offices, conveys the following:

[...] The customer would require a new Greek sans type face to their own design as well as existing Linotype Greek faces. On returning to Altrincham I consulted Walter Tracy as to the availability of Greek grids, he confirmed that Greek is now the responsibility of L&M [...] As to the preparation of a new face it is impossible to state a delivery date, bearing in mind the many factors outside L&M control on such development work. [...] whether MLCo are prepared to do this development for Greek remains to be seen.²⁰⁰

APC's request for a new custom typeface resurfaced in a letter dated 18 December 1969 from Mike Parker, Director of Typeface Development at Mergenthaler, to Albert Salt, General Sales Manager for Europe at MINT. It was Parker's response to a previous letter by Salt dated earlier that same month.²⁰¹ Parker's approach was cautious as he was well-aware of the technical implications and financial costs that creating a new typeface from scratch entailed:

¹⁹⁹ Ibid., 2-3.

²⁰⁰ David Tyrwhitt-Drake to E.S. Emery and Walter Tracy, report, 'DJTD/JQ. Nicholas Avronidakis – Manager, Athens Publishing Center Graphic Arts Co. Ltd., 39, Demokritou Street, Athens 136', 20 October 1969.

²⁰¹ Salt's letter was not found in any of the archives that were consulted during the course of this research.

I can see that the whole question of the new face is starting to get a little sticky. From your earlier letter, I had gathered that they had such a face and that the only problem was to put it on the Quick. From your new letter I understand that they actually wish to go out and design a new face on their own. I also understand that we are expected to cooperate by providing the necessary technical limitations within which the designer must work to produce a new Greek design for the Super Quick.²⁰²

The tone of Parker's letter became more concerned as he explained to Salt that developing new typefaces was a time-consuming process that required highly specialised knowledge and skills — something that neither Salt nor APC appeared to be aware of. Moreover, Parker must have been all too conscious of the relatively recent and protracted experience of designing Caledonia Greek as he continued:

Albert, the last paragraph implies more than they or you realize. It says, in effect, that we are expected to train a new Matthew Carter. There are very few people on the face of this earth who can send in a set of drawings for a machine that will be correct. Normally a new face requires constant experimentation, master after master after master to be made. Each one costs us about \$800. You can appreciate my desire to avoid this sort of nonsense given our current Quick load. You can see how a typeface developed this way can be more expensive to Mergenthaler than one made by our own design staff. I am not willing to set prices on this job without knowing a great deal more about it than we do now. However, I would expect it to be an expensive project.²⁰³

Parker's letter clearly suggested that APC wanted to have exclusive rights in the new typeface. From APC's point of view, the desire for exclusivity was presumably driven by two reasons: firstly, the typeface would be used to brand DO publications; and secondly, along with the installation of the Linofilm Super-Quick, the typeface would give APC a competitive edge in the Greek printing market by establishing them as a pioneering company in the field. Nonetheless, exclusivity was not acceptable to Mike Parker, and he ruled it out outright:

I don't think that there can be any question of granting Athens Publishing Center exclusive rights in such a face. We can expect to put into this design a great deal of intense effort, a lot of trials and remakes, however the design is undertaken. For this, Mergenthaler expects to get a serviceable Greek typeface that will help us sell further machines. With the pace that the world moves today, we would want rights in the face in the beginning.²⁰⁴

As was discussed in 3.1, the size of a manufacturer's type library directly affected the value and sales of its typesetting machines, and Linotype invested heavily in the development of new typefaces. The above excerpt further clarifies this strategy by underlining the commercial considerations that underpinned type design. However, Parker did not dismiss the project. On the contrary, he was aware of the lack of suitable Greek typefaces in the Linotype type library, and it is possible that he felt that there was now a new opportunity to develop a new Greek typeface afresh by placing more robust parameters around the project, and therefore avoid the mistakes that were made during the design of Caledonia Greek:

²⁰² Mike Parker to Albert Salt, 'Athens Publishing Center, Athens - Greece', 18 December 1969. File 20, Greek, WTC, DTGC.

²⁰³ Ibid.

²⁰⁴ Ibid.

We are interested in a new Greek typeface since nobody realizes better than us the weakness of our existing matrix library. For this reason we undertook to make the new Caledonia Greek on matrices, which was a harrowing experience due to the constant changes in concept and detail introduced by Chrysochoides. I therefore welcome the chance of working with somebody who should have a clear and more specific idea of their wants.²⁰⁵

The typographic requirements the new design needed to fulfil were also equally important, and in this instance Parker did not have a clear idea about the purpose of the new design:

I would propose that you get from Doxiades a statement on the sort of design that they wish. Is it a newspaper, book face or general purpose design? Should it be upright or sloped? Serifed or sanserif? What designs does he admire?²⁰⁶

It is unclear whether Parker's question about Doxiadis's typeface preferences was specifically answered; no correspondence, either from Salt or APC, from any of the archives used shows evidence to that effect. Salt's next reply on 29 December 1969 informed Parker that he had been told by Nicholas Avronidakis that APC had already been in contact with the Haas foundry and an unnamed Swiss type designer.²⁰⁷ They had also received offers from several well-known artists and designers, also unnamed in the letter, to draw a new Greek typeface for them.²⁰⁸ Avronidakis himself remembers very little on this subject:

On the matter of Greek typefaces for the LSQ I do remember that I had contacted a graphic arts professor of the Athens Technological Institute (I don't believe there had been any typeface designers as such in Greece) who said he could design one but would take a long time and at an inordinately high price. I assume that it was at this time that Mr. Chrysochoides in order to improve his overall sales package for the LSQ arranged with Linotype to provide the Greek version of Helvetica (which we knew and liked in its Latin version) as part of his offer. It seems that Sophia Zarabouka had been also involved in some way although she also does not seem to remember anything specific in this case.²⁰⁹

There is no archival evidence to confirm that Costas Chrysochoides was involved in the discussions between Linotype and APC about the new typeface. It is possible that, after the unsatisfactory experience with Caledonia Greek, Chrysochoides was kept away from the prospective new project. Salt responded to Parker's comments regarding Chrysochoides's involvement in the design of Caledonia Greek in a mildly derisive manner:

I am fully aware of the difficulties in dealing through our Linotype agent — Costas Chrysochoides is well connected with newspaper people who, in a country like Greece, can be rather pretentious. These contacts of his are not necessarily the best so far as new type designs are concerned.²¹⁰

²⁰⁵ Ibid.

²⁰⁶ Ibid.

²⁰⁷ Parker later discovered that the unnamed Swiss type designer was most likely André Gürtler who had been questioning Linotype staff on the characteristics of the Linofilm Super-Quick in connection with a Greek typeface. Mike Parker to Albert Salt, 'Athens Publishing Center, Athens, Greece', 26 January 1970. File 20, Greek, WTC, DTGC.

²⁰⁸ Albert Salt to Mike Parker, 'Athens Publishing Center, Athens, Greece', 29 December 1969.

²⁰⁹ Avronidakis, email interview, 14 June 2017.

²¹⁰ Albert Salt to Mike Parker, 'Athens Publishing Center, Athens, Greece', 29 December 1969.

He also confirmed to Parker that he had put his points across to APC and they remained interested. He clarified that he would not have any problems talking the company out of the subject of exclusivity which he explained further:

[...] I do not think that I shall have much difficulty with the subject of “exclusivity” and I am quite convinced that I will be able to talk them out of this idea — their natural worry is that they would not care to receive grids of a new typeface, and at the same time the market being flooded with hot metal matrices. I explained there is bound to be a time lapse between the grids being manufactured and the matrices.²¹¹

After Albert Salt’s letter on 29 December 1969, there was further correspondence: a letter from Nicholas Avronidakis to Salt dated 30 December 1969 and a letter from Salt to Parker on 2 January 1970. Copies of these letters were not found in the archival sources consulted for the research, so it is only possible to surmise what was agreed between APC and Linotype from Mike Parker’s letter to Salt on 26 January 1970:

Doxiades would like to have a new design that is a Greek counterpart of Optima or Helvetica. They prefer Helvetica; we would recommend it as being the most satisfactory for our own reasons.²¹² We will undertake the production of any Greek typeface that derives from one of our roman designs, since an outside consultant makes no sense under these conditions. The typeface will be called by its Linotype name. As agreed earlier, the work will probably be done by Matthew Carter. He will come to Greece, if necessary, to make the final arrangements. We are not prepared to grant Doxiades exclusivity on this typeface — but we have no plans to produce on Linotype matrices a new typeface in the coming months. We will provide the new design within twelve months from agreement on the essentials and receipt of order. Price will be \$375 per grid and width plug — as with all other Greek grids.²¹³

It appears that between December 1969 and January 1970 Parker and Salt had been successful in persuading APC to forgo the idea of a custom type design. Instead, Parker offered to draw a Greek version out of an existing Linotype design, and the choice seems to have been narrowed down between Helvetica and Optima. Parker preferred Helvetica which was not surprising; he thought it ‘more saleable’, and justifiably so.²¹⁴ From a financial standpoint, Linotype had benefited enormously from the commercial success of Helvetica: not only did it pay the Haas Foundry, where the typeface had originated, unusually low royalties, it also held the exclusive rights to market Helvetica as a typeface for mechanical composition. Moreover, Linotype did not allow Haas to negotiate license agreements with other type manufacturers without compensation for loss of revenue. Therefore, Helvetica had become a major selling point for Linotype’s type library, and competing manufacturers were only able to offer similar alternatives.²¹⁵

Furthermore, taking into account the influence of the Swiss Style on DO publications as well as Doxiadis’s intellectual links with modernist ideas, Helvetica was a wholly suitable

²¹¹ Ibid.

²¹² Although this research did not find first-hand evidence, there is strong anecdotal belief in the contemporary type community, that Mike Parker had been a moving force behind the promotion of Helvetica, especially in the U.S.

²¹³ Mike Parker to Albert Salt, ‘Athens Publishing Center, Athens, Greece’, 26 January 1970.

²¹⁴ Ibid.

²¹⁵ Langer, Axel, ‘An Impersonal Typeface for Today and Tomorrow’, in *Helvetica Forever. Story of a Typeface*, ed. by Victor Malsy and Lars Müller, (Baden: Lars Müller Publishers, 2009), 63.

choice. Since its release in the postwar printing market, Helvetica had come to represent typographic modernity as defined by the Swiss Style. It was expressly designed to be ‘impersonal’; in other words simple and legible whilst consciously eschewing fashionable typographic trends. As a result, it was used flexibly in a variety of applications — from corporate print communications and branding to signage and book design. Reaching its commercial peak in the 1960s, Helvetica had, at the time the discussions between APC and Linotype were taking place, become the prevailing typeface for branding international businesses and organisations.²¹⁶ As Matthew Carter, the designer of Helvetica Greek, has stated, Doxiadis wanted his publications to have high production values, and APC had felt strongly that a Greek version of the typeface was necessary so that DO publications could compare favourably to equivalent foreign-language publications abroad.²¹⁷ In choosing to adapt Helvetica over Optima for Greek, Doxiadis and APC were aligning themselves with mainstream typographic modernity.

A subsequent letter from Parker to Salt on 6 February 1970 further clarified the following: Mergenthaler agreed to design and manufacture grids for the normal sizes of Helvetica Greek, Helvetica Greek Italic and Helvetica Greek Bold, or of another new Greek typeface mutually satisfactory to APC and Mergenthaler; and, Mergenthaler did not contemplate releasing any such typeface on matrices within a period of eighteen months, allowing APC to use the typeface exclusively in the Greek printing market during that time. Finally, Parker made an unusual concession: should APC have a truly new type design of their own, Mergenthaler would be willing to put it on grids providing that APC undertook to prepare artwork to Linotype’s exact specifications, and was willing to pay for the subsequent set-ups for revision on new designs.²¹⁸ Perhaps the reason for this concession was that Parker was by then satisfied with the negotiations with APC, and was assured that the brief about the new design had been sufficiently clear.

In the late 1960s, the use of photocomposition was expanding. In particular, 1969 had been a year busy for technical innovation; no fewer than twenty models from different manufacturers had appeared on the international market between January and October.²¹⁹ Linotype itself was about to launch its most successful phototypesetter yet, the Linofilm Variable Input Phototypesetter (V-I-P), one of the first phototypesetters with a programmable minicomputer as a controller and text processor (see chapter 6).²²⁰ As discussed in 3.1, during that time Parker was already overseeing the conversion of Linotype’s type library from hot-metal to photocomposition to enlarge its market share, and ensure the competitiveness of their phototypesetters. The programme also included the development of new typeface families for non-Latin scripts such as Greek. Following the design of Caledonia Greek, Helvetica Greek was the second typeface to follow in a programme of Greek type development that continued during the 1970s (see chapter 6). However, the conditions now were different; having learned valuable lessons from the development of Caledonia Greek, Mike Parker did not work through Costas Chrysochoides, whose indecision had been counterproductive

²¹⁶ Hollis, Richard, *Swiss Graphic Design. The Origins and Growth of an International Style. 1920-1965*, (London: Laurence King Publishing, 2006), 252.

²¹⁷ Carter, ‘Which Came First, the Greeks or the Romans?’, 197.

²¹⁸ Mike Parker to Albert Salt, ‘Athens Publishing Center, Athens, Greece’, 6 February 1970. File 20, Greek, WTC, DTGC.

²¹⁹ Wallis, ‘The Phototypesetting Jungle’, 213.

²²⁰ Wallis, *Typomania*, 48.



Figure 5.5. Letraset's Helvetica Greek. Carter asked Tracy, as part of his research, to send him a 42-point sheet of the Helvetica Medium Greek in order to study the design. From the Letraset catalogue (1981), 197. DTGC. 60% of original size. In 1974, three years after the design of Helvetica Greek, Carter discussed with Mike Parker the possibility of Linotype licensing its version of Helvetica, Optima and Caledonia Greek, along with a number of Hebrew and Cyrillic typefaces, to Letraset. Roger Couch, the Typographic Director of Letraset, had told Carter that Letraset's Helvetica Greek, which had been available in the Greek market much earlier than Linotype's, had always sold extremely well. Carter himself considered Letraset's Helvetica Greek 'a poor thing that has been around since before we did the real one'. However, according to Couch, sales of Letraset's non-Latin typefaces had always been 'extremely good', and Greece was Letraset's second most sophisticated market after Israel. In the letter, Carter wondered whether Letraset's Helvetica Greek had 'caused resistance to our version'. From the extant Linotype correspondence, there is no evidence that Carter received an answer to his question or whether Linotype licensed its Greek typefaces to Letraset. See Matthew Carter to Mike Parker, 2 January 1974. File 17, Non-Roman General, WTC, DTGC.

to that project.²²¹ Instead, Parker took direct control of the new brief from the beginning by setting firm parameters around it to ensure that the time invested by Linotype would produce a design with a ‘useful future’.²²²

5.3 The design of Helvetica Greek

The interviews that were conducted with Sophia Zarabouka and Nicholas Avronidakis did not yield any information regarding the design process of Helvetica Greek. Zarabouka could not recall any details regarding the project, or the role of Matthew Carter and Mike Parker. The same is also true for Avronidakis. Therefore, aspects of this project that could not be explored further included: the specific requirements of the brief; the number of people from APC contributing with feedback; the degree of involvement Doxiadis had during the design of the typeface; the type of advice or feedback that was given to Matthew Carter, and whether it was incorporated satisfactorily into the design. Therefore the available sources for the development of Helvetica Greek are Carter’s interview recollections, his writings from secondary sources regarding his work on the Greek typefaces included in this thesis, and the Linotype records. The type designer Takis Katsoulidis (see 2.3) remembered receiving a phone call from Zarabouka who discussed the project with him, and asked for advice that she could pass on to Carter. However, he could not recall the details of the conversation.²²³

Mike Parker considered Matthew Carter a suitable type designer for the project; he had already designed successful non-Latin typefaces (Hebrew and Korean), and, being able to read Classical Greek, he had a particular interest in Greek letterforms.²²⁴ He and Parker had travelled to Athens early on to look for and engage a local type designer to work with them on the project. Unable to find one, APC recommended that they engage Sophia Zarabouka instead as someone suitable — both as a designer and as a native Greek speaker — to give feedback to Carter’s designs. Parker and Carter met with her and liked her design work. More importantly, they thought her knowledgeable, with an eye for detail, and found her advice very reliable. Carter in particular expressed the belief that both himself and Parker considered themselves lucky to have her contribute to the project.²²⁵

Carter had done some initial sketches whilst Parker was finalising the terms and conditions of the project with APC.²²⁶ Although he had designed mathematical Greek during his time at Crosfield Electronics, Helvetica Greek was his first Greek typeface design.²²⁷ For his research, he had collected examples of Greek text he found interesting or useful during his Athenian visit with Parker.²²⁸ He was also aware of Letraset’s Helvetica Greek dry-transfer version. He asked Walter Tracy to mail him a 42-point Helvetica Medium Greek sheet, which

²²¹ According to Parker, the design process of Caledonia Greek was still ongoing at L&M throughout the negotiations for Helvetica Greek in late 1969 and early 1970. Mike Parker to Albert Salt, ‘Athens Publishing Centre, Athens, Greece’, 26 January 1970.

²²² Quote from Parker: ‘I am certainly not willing to invest our best designer’s [Matthew Carter] time for a period of some months unless we at Mergenthaler agree that the design has a useful future’. Mike Parker to Albert Salt, ‘Athens Publishing Centre, Athens, Greece’, 6 February 1970.

²²³ Katsoulidis, personal interview, 13 July 2017.

²²⁴ Mike Parker to Albert Salt, ‘Athens Publishing Centre, Athens – Greece’, 18 December 1969. For biographical information on Matthew Carter, see Appendix B.

²²⁵ Carter, Matthew, personal interview, TypeCon, Washington D.C., USA, 2 July 2014.

²²⁶ Mike Parker to Albert Salt, ‘Athens Publishing Center, Athens, Greece’, 26 January 1970.

²²⁷ Carter, personal interview, 2 July 2014.

²²⁸ Ibid.

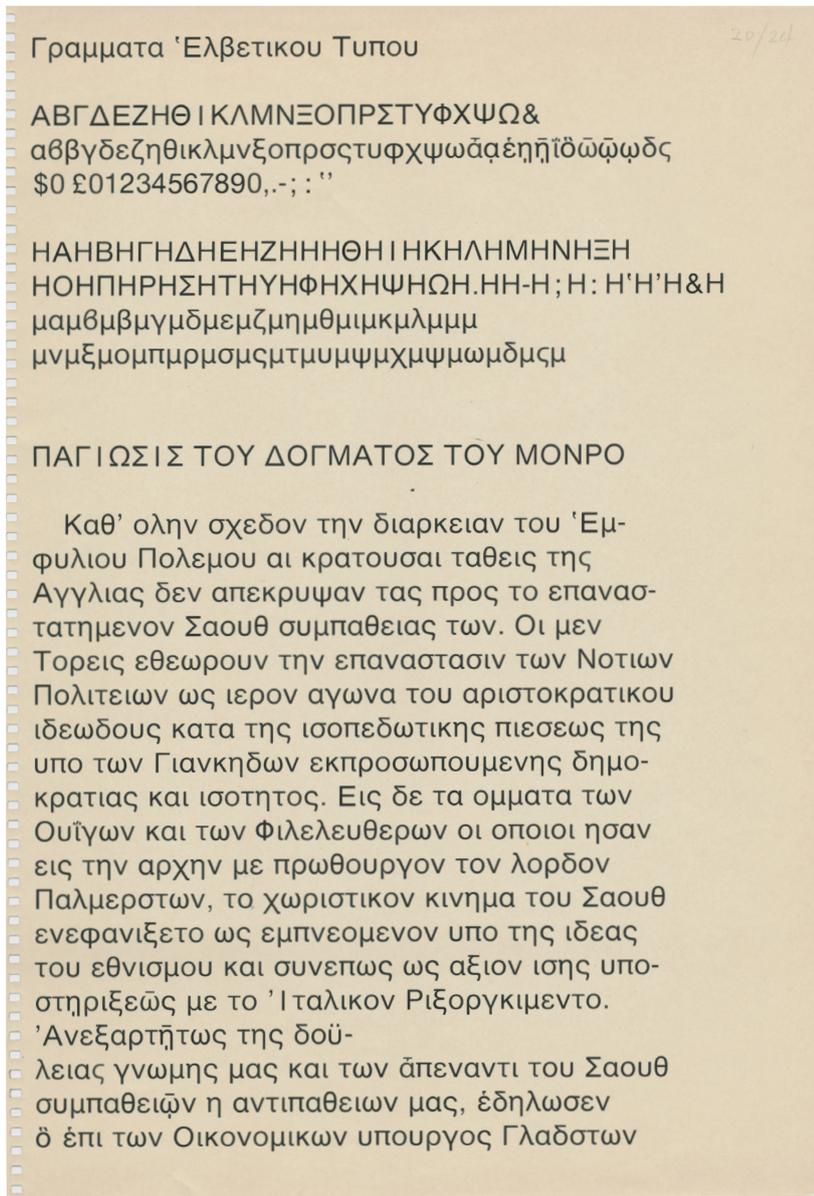


Figure 5.6. Trial text setting proof of Helvetica Greek (20/24) on photosensitive paper. The letters eta (H) and mu (μ) are used as standard spacing for the upper- and lowercase respectively. Nonetheless, the uppercase iota (I) is badly spaced as can be seen in the fifth row (from top) and in the Greek text that follows below. 1970. LGA, DTGC. 55% of original size.

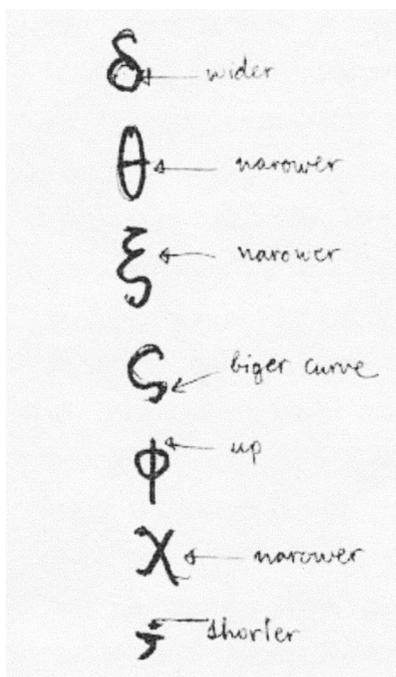


Figure 5.7. Example of Sophia Zarabouka's comments to Matthew Carter. There is no archival evidence that the comments are related to the trial proof above. However, Zarabouka would have seen such proofs in order to give feedback to Carter. From Macrakis M.S., *Greek Letters. From Tablets to Pixels*, 198. 130% of original size.

he could not obtain in New York, in order to study the typeface more closely (figure 5.5, page 108).²²⁹

Ross says that ‘the design brief forms the cornerstone of most typeface design, and it has ever been thus’.²³⁰ The brief from APC required that the design for Helvetica Greek remained as close to the Latin Helvetica as possible, and this requirement set the tone of the project from the beginning. In order to create the design for each character, Carter referenced the original drawings of the Latin Helvetica at Mergenthaler. Letters that were common between the two scripts were retained; for example, the Latin lowercase ‘o’ became the Greek omicron.²³¹

The design process entailed a considerable amount of testing. Photomatrices were made from Carter’s drawings, and text composed with them was produced in order to test the performance of the typeface specifically on the Linofilm Super-Quick. Testing ensured that each of the characters was legible, and that the typeface as a whole was consistent and easy to read.²³² Carter recalled that trial typesetting proofs were produced on photosensitive paper and sent to APC and Zarabouka for their input (figures 5.6 and 5.7). Feedback was relayed to Mike Parker, who then discussed it with Carter.²³³ Any corrections to the character drawings would have been incorporated directly into new versions of the photomatrices relatively quickly.²³⁴

The first Helvetica Greek grid was delivered to APC in January 1971 whilst Avronidakis was in London to discuss the Linofilm Super-Quick installation at the Linotype-Paul office. The project was completed when the remaining grids were delivered in July 1971. A brief letter from Avronidakis to Mike Parker from 17 July 1971 confirmed the event:

Just a few words to say thank you for the Helvetica Greek. They are extremely nice, and I have high hopes for their success in the Greek market.²³⁵

Linotype correspondence after July 1971 contains no further information on Helvetica Greek’s usage from APC. As was discussed in 4.2, Linotype benefited quickly from the successful installation of the Linofilm Super-Quick at APC and the newly-designed and commercially available Helvetica Greek; in less than a year, they had received an order for a Linotron 505, also equipped with the typeface. By the end of the 1970s Helvetica Greek had become a relatively extensive typeface family; archival office documents from 1979 show that Linotype completed Helvetica Greek Condensed in 1975, including the following weights and styles: condensed italic, bold condensed, bold condensed italic.²³⁶ That same year Linotype also released Helvetica Greek Light and Light Italic.²³⁷ An additional office document from 1979 regarding the future planning for new Greek typefaces further demonstrates that there were

²²⁹ Matthew Carter to Walter Tracy, telex, 1 April 1970. File 20, Greek, WTC, DTGC.

²³⁰ Ross, Fiona, ‘Non-Latin Scripts: Key Issues in Type Design’, in *Non-Latin Scripts. From Metal to Digital Type* by Fiona Ross and Graham Shaw. (London: St. Bride Library, 2012), 129.

²³¹ Carter, personal interview, 2 July 2014.

²³² Southall, Richard, ‘A Survey of Type Design Techniques Before 1978’, in *Typography Papers 2*, ed. by Paul Stiff, (London: Hyphen Press, 1997), 50–52.

²³³ Carter, personal interview, 2 July 2014.

²³⁴ Southall, 50–52.

²³⁵ Nicholas Avronidakis to Mike Parker, 17 July 1971. Unsorted, LGA, DTGC.

²³⁶ ‘Non-Romans, Greek, cont’d.’, office document, 20 March 1979. Unsorted, LGA, DTGC.

²³⁷ Ibid.

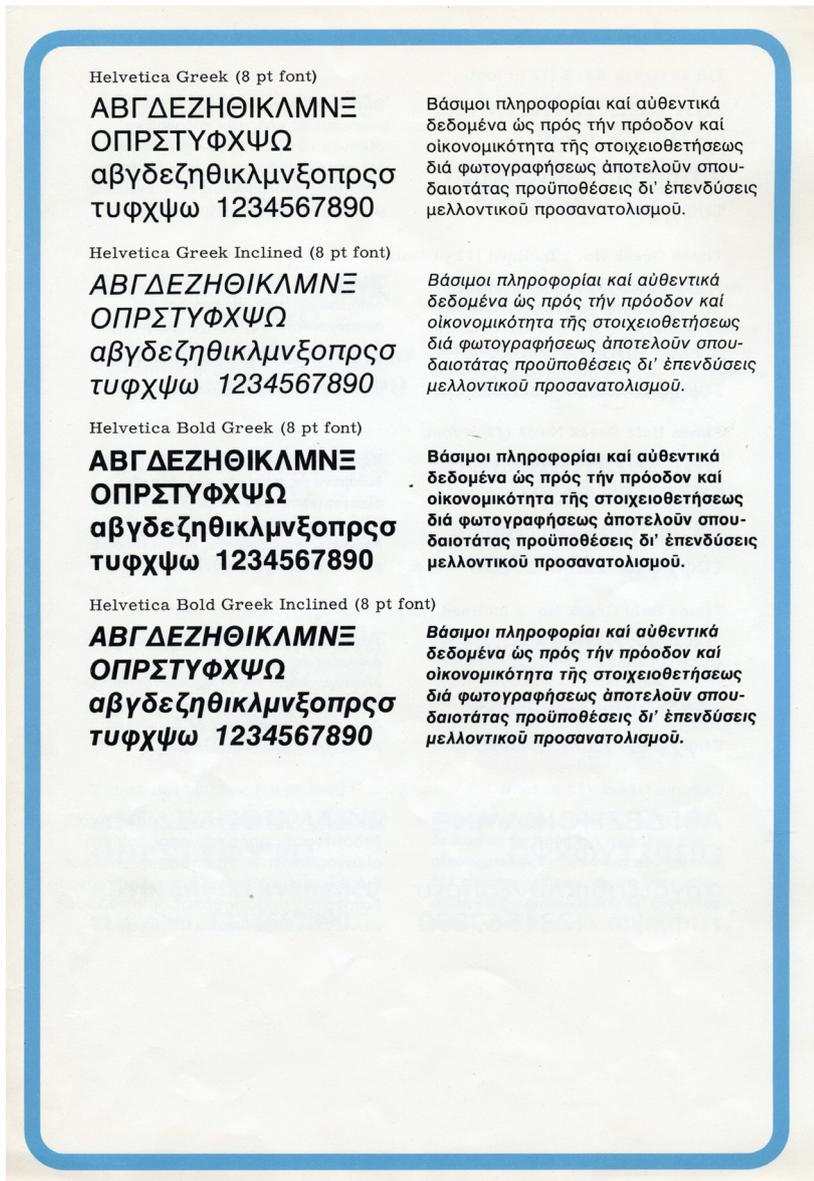


Figure 5.8. (Left and below the caption). The lowercase of Helvetica Greek and Helvetica Greek Italic feature terminal strokes whereas Helvetica Greek Bold does not. The result is a lack of uniformity among the three styles. See selected characters below. *Stempel Information Photocomp Type Faces. Non-Romans – such as Greek (1980), LGA, DTGC. 53% of original size.*



Helvetica Greek	α	α	ι	ι
Helvetica Latin	a	a	i	i

Table 1. The table shows that the modulation of Helvetica Greek closely follows the modulation of the Latin Helvetica, evident in the correspondences between lowercase ‘a’ and ‘i’ with lowercase alpha (α) and iota (ι).

plans for the design of Helvetica Greek Black. However, it is unclear whether these plans went ahead due to lack of further information in the archives used.²³⁸

5.4 Evaluation of Helvetica Greek

The lack of detailed first-hand accounts and archival sources on the process of adapting Helvetica for Greek necessarily means that the evaluation that follows below is incomplete. Therefore, it has not been possible to find out precisely all the factors that may have come to bear on the project, such as how much influence APC had on the final outcome. A number of archival materials have, however, contributed to an understanding of the design process. These materials are as follows:

- Nine trial character and typesetting proofs from the Linotype Greek Archive; five from 1970 documenting the design of Helvetica Greek, and four from 1971 documenting the design of Helvetica Greek Bold and Italic.
- *Stempel Information Photocomp Type Faces. Non-Romans – such as Greek* type specimen dated from 1980, and included in the Linotype Greek Archive.
- A letter from Mike Parker to Nicholas Avronidakis dated 9 March 1971, and included in Walter Tracy's correspondence. It is a response to a letter of comments and suggestions by Avronidakis dated 14 January 1971,²³⁹ and is the only piece of correspondence documenting any feedback on the design of Helvetica Greek.
- APC's type specimen for phototypesetting.²⁴⁰

Although the materials listed above give rise to interesting observations, they cannot always supply definitive answers as to why some design decisions were made. The evaluation includes Helvetica Greek's regular, bold and italic styles, and the criteria used are the same as those for Caledonia Greek: the consistency of characters in relation to each other; the readability of the typeface as a whole; and its harmonisation with the Latin Helvetica (see 3.4).

The first observation concerns the uniformity of Helvetica Greek as a typeface family. The regular and italic lowercase styles have characters with terminal strokes, giving an appearance of smoothness between the strokes and the bowls, whereas the bold lowercase does not. The result is that the bold style looks considerably more upright, and stands out against the other two. This is evident not only in the existing trial proofs but also in the final iteration of the typeface (figure 5.8). In discussing the more open appearance of the Greek compared to Latin, Mike Parker responded to Nicholas Avronidakis's letter — dated 14 January 1971 — that terminal strokes at the end of characters were helpful:

[...] The terminal curves on letters like (t) help rather than aggravate the situation. They fill up part of the intervening space without driving the letters further apart. At the stage in which we took the design to Athens we had a version without these terminal curves, which was rejected — rightly I believe (and very positively). The 'straight' version looked harsher, less Helvetica-like and its characters combined less well.²⁴¹

²³⁸ 'Plan for next Greek typefaces', office document, 21 March 1979. Unsorted, LGA, DTGC.

²³⁹ This letter has not been found in any of the archives that were consulted for this research.

²⁴⁰ This is a rare type specimen and it is used in the evaluation with the kind permission of Dimitris Legakis of the Archive of Visual Communication in Greece, Athens, Greece.

²⁴¹ Mike Parker to Nicholas Avronidakis, 9 March 1971. File 20, Greek, WTC, DTGC.



Figure 5.9. Examples of the circumflex and the iota subscript from trial proofs. The thickness of the circumflex is disproportionate to the characters. Its shape should be curved, not straight. The iota subscript is too short and without a right terminal curve at the bottom. It is also not positioned correctly under the eta (ἦ); it needs to be offset to the left under the vertical stroke. Helvetica Greek, 1970. LGA, DTGC. 185% of original size.



Figure 5.10. Examples of different combinations of accents from trial proofs. The accents on the far right have been fused together to save space due to Helvetica's large x-height. Helvetica Greek, 1970. LGA, DTGC. 185% of original size.



Figure 5.11. The descending lower terminals of zeta (ζ) and xi (ξ) are inconsistent with the lower terminal of the alternate sigma (ς). LGA, DTGC. 175% of original size.



Figure 5.12. The alternate sigma (ς) (left), alongside a more open version (right). LGA, DTGC. 175% of original size.

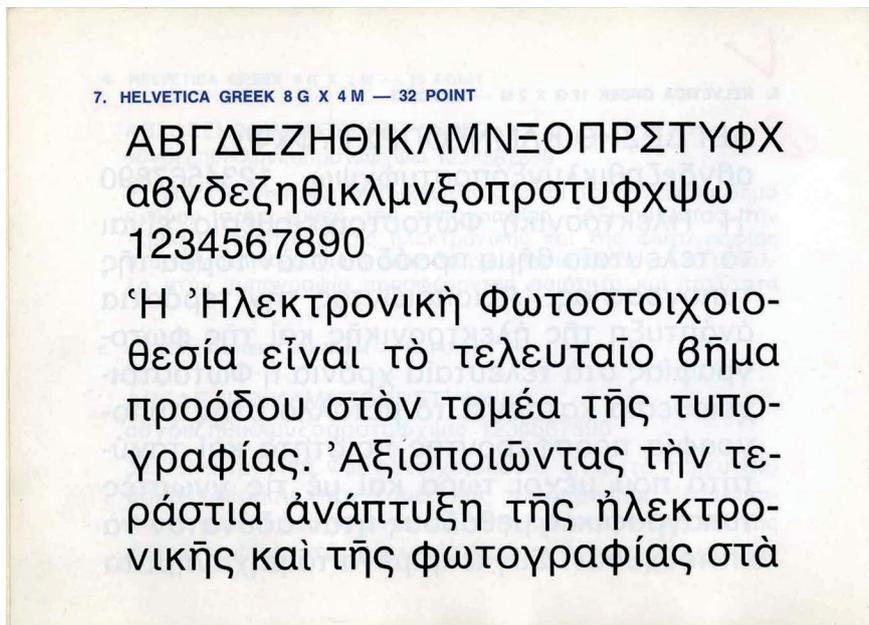


Figure 5.13. Page from APC's type specimen which features Helvetica Greek's alternate forms of (β) and (φ) whereas *Stempel Information Photocomp Type Faces* does not (see figure 5.8). It is possible that these two characters were replaced or redesigned between the printing of APC's specimen and Linotype's catalogue. Also, the accents next to the uppercase eta (Η) and alpha (Α) in the sample text are unevenly spaced. Circa 1971-72. Used by kind permission of Dimitris Legakis, Archive of Visual Communication in Greece, Athens, Greece. 50% of original size.

In the quote above, Parker must be referring to the regular style of Helvetica Greek as the description does not describe the bold style accurately. Evidently, a more upright version had already been rejected by APC, and Parker had been in agreement with that decision. It is puzzling that the characters of Helvetica Greek Bold did not also have terminal strokes to match the regular (and italic) style. This disparity maybe evidence that Helvetica Greek was modelled closely on the Latin Helvetica. In particular, the modulation of Helvetica Greek matches the modulation of the Latin Helvetica, both in the regular and bold styles. This can be seen in the design of the lowercase ‘a’ and ‘i’ of the Latin Helvetica against the lowercase alpha (α) and iota (ι) of Helvetica Greek respectively (table 1, page 112).

There is also lack of uniformity in the design of accents. The circumflex is thin and disproportionately small to the rest of the characters. It is also straight, lacking its traditional curved form (figure 5.9). The iota subscript is also disproportionate: it is quite short and is missing a right terminal curve at the bottom (figure 5.9). The design of these accents diminishes their legibility, especially in small text sizes. Furthermore, Helvetica’s large x-height allows for little space above characters therefore complex combinations of accents which require plenty of space do not have a consistent style. The shapes of (̄) and (̄) accents especially are fused together in order to save space (figure 5.10) which means that they are not as legible as other, single accents which take up less space. The positioning of accents above characters, the lack of space the design afforded, as well as the diminished legibility must have been commented upon by Avronidakis as Parker responded that:

We have raised the ̄ and ̄ above the other accents, as high as we dare — and have improved their shape. We cannot do better.²⁴²

The use of accents in Greek was essential at the time as written language still employed the use of the polytonic system (see Appendix A). Therefore their successful design and incorporation with the rest of the character set was critical. Before the launch of the Variable Input Phototypesetter (V-I-P), the scope for positioning accents was limited (see chapter 6). A solution would have been to reduce Helvetica Greek’s x-height. However, this reduction would have contributed to a lack of balance between Helvetica Greek and its Latin counterpart in instances where bilingual typesetting was needed. Despite Parker’s assurance that the shapes of the accents were improved, the design solution remained poor and, in addition to the diminished legibility of the accents, contributed to a reduced readability of Helvetica Greek as a whole.

Parker’s letter also suggests that the design of some letterforms, such as (ς), may have been influenced by Avronidakis:

‘We have adopted your suggestion without making final sigma identical with (ζ) or (ξ). We had a version of the sigma drawn in this way on our trip to Athens last summer. It was decisively rejected. We believe we know what you mean about the curves — and have improved them.’²⁴³

It is hard to surmise what Avronidakis’s suggestion may have been; however, there are inconsistencies in zeta (ζ), xi (ξ) and final sigma (ς): the descending lower terminals of zeta (ζ) and xi (ξ) are horizontal before they curve into the tail, but in the final sigma (ς) the lower terminal appears more oblique (figure 5.12). In the earlier proofs, another version of

²⁴² Ibid.

²⁴³ Ibid.

ΑΒΓΔΕΖΗΘΙΚΛΜΝΞΟΠΡΣΤΥΦΧΨΩ
ΆΈΉΊΌΎΏΪΫ ~ ' ¨ : ;
αβγδεζηθικλμνξοπρστυφχψω
άέήϊϋϊϋούώϑϣϥ

*ΑΒΓΔΕΖΗΘΙΚΛΜΝΞΟΠΡΣΤΥΦΧΨΩ
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Figure 5.14. Helvetica Greek for Linotype, designed by John Hudson at Tiro Typeworks and released in 2001. This design maintains a balanced approach between the characteristics of the Greek script and the typographic style of Helvetica. There is also a uniform consistency among the regular, italic and bold styles.

alternate final sigma (ς) seemingly designed to eliminate this inconsistency also appears, but then the upper curved terminal is too open (figure 5.12, page 114). Inconsistencies in the design of letterforms also occur in final iterations of the Helvetica Greek; APC's type specimen displays the alternate forms of (β) and (ϕ) whereas the *Stempel Information Photocomp Type Faces* specimen does not (figures 5.13 and 5.8 respectively, pages 114 and 112). Although APC's specimen is undated, it was evidently printed much earlier — most likely around 1971 or 1972 once the company took delivery of Helvetica Greek — than 1980 when Linotype's specimen appeared. It is therefore possible that these characters may have been revised during that time.

One of the main challenges of this project would have been the harmonisation between the Latin and Greek Helvetica — that is the incorporation of Helvetica's defining features in the Greek letterforms without compromising their intrinsic characteristics. Based on what can be deduced by the available archival material, as well as considering the influence of the brief which required that Helvetica Greek stay close to the original Latin, this must have been a fine balance to achieve. As a result, Helvetica's upright character dominates over the essential features of the Greek script. Although the regular and italic styles are more successful than the bold, the design inconsistencies described above compromise the final outcome. As an alternative way of adapting Helvetica for Greek, it is worth mentioning the digital version of Helvetica Greek designed for Linotype by the type designer John Hudson, and released in 2001 (figure 5.14). In comparison to Linotype's Helvetica Greek for photocomposition, this newer design maintains a visibly balanced approach between the characteristics of the Greek script and the upright character of Helvetica. Moreover, a uniform consistency has been achieved between the regular, italic and bold styles.

Finally, it is interesting to note that the design process of Helvetica Greek was very different as well as considerably smoother than that of Caledonia Greek. The team involved in its development was small and more focussed compared to the lack of direction and numerous change of hands that Caledonia Greek went through. This time Mike Parker had the overall responsibility of the project, whilst Matthew Carter focussed solely on the design of the typeface. Rather than involving Costas Chrysochoides, who contributed only a small amount of feedback to this project²⁴⁴, Parker and Carter consulted with the more suitable and experienced designer Sophia Zarabouka. These factors indicate that Linotype had learned from the arduous experience of designing Caledonia Greek, and was now keen not only to avoid making the same mistakes, but also improve its methods in order to produce better results.

5.5 Conclusion

The design of Helvetica Greek was instigated by Constantinos Doxiadis's desire to produce DO publications that were modern and would compare favourably to equivalent foreign-language publications abroad. From the outset, Doxiadis had been sensitive to the value of design in the dissemination of information. He was equally aware of the value of books as objects. To that effect, he had devised a systematic design strategy that took into consideration the formats as well as the standardisation of the page layout for key

²⁴⁴ Ibid.

publications that DO produced. The installation of the Linofilm Super Quick at the APC offices greatly facilitated this design strategy by bringing typesetting in-house and not having to rely on external suppliers any more.

Moreover, Doxiadis was sensitive to typography, and the discussions he had with DO designer Sophia Zarabouka made him willing to look into solutions that would help improve the typographic look and feel of DO publications. Concurrent with the order of the Linofilm Quick, APC began negotiations for the design of a custom sans serif for its exclusive use in the Greek market. From the beginning, Mike Parker kept a tight rein on the project. Unwilling to concede to all of APC's requirements, Parker set clear parameters and managed to distill the brief so that it would also commercially benefit Linotype; APC could choose an appropriate Latin typeface from Linotype's type library to be adapted for Greek. In return, Linotype would add a new and useful Greek design to their library that would help with the future sales of phototypesetters. Between Helvetica and Optima, APC chose Helvetica, a typeface that not only personified typographic modernity but had also been commercially successful for Linotype.

First-hand accounts obtained in the course of this research produced little information on the design process of Helvetica Greek. Matthew Carter, the designer of the typeface, stated that APC wanted the design to remain as close to the Latin Helvetica as much as possible. The influence of the brief is evident in the extant archival proofs, which demonstrate that the final outcome favoured Helvetica's upright character over the essential features of the Greek script. Furthermore, inconsistencies in the uniformity of Helvetica Greek as a typeface family, as well as inconsistencies in the design of accents reduce the legibility of characters and the readability of the typeface as a whole. Nonetheless, Linotype demonstrated that lessons from the design of Caledonia Greek had been learned, and the small and focussed team that completed the design of Helvetica Greek improved their working methods in order to produce better results.

The following chapter investigates Linotype's expansion of Greek type development throughout the 1970s as a result of its successful collaboration with APC, and examines the extent that this development constituted a long-term design programme.

6 Building a Greek type library for photocomposition

This chapter examines the design of four Greek typefaces which were produced after Helvetica Greek: Optima Medium Greek, Cadmus, Century Schoolbook Greek and Baskerville Greek, all designed between 1972 and 1980. These are only some of the Greek typefaces for photocomposition that Linotype produced during that time in an effort to support the sales of its phototypesetters in the Greek printing market.²⁴⁴ However, the available archival sources provided little to no information regarding their inception and development. Moreover, without a sufficient number of archival sources, such as relevant correspondence, type drawings, and character and text setting proofs, it is not possible to reconstruct the context in which all these typefaces were created, and allow a rigorous investigation and evaluation of them. Therefore this chapter, which is divided into six sections, concentrates on the four typefaces mentioned above, whose archival sources provide enough material to discuss and assess them. More specifically, section 6.1 investigates whether the design of these typefaces constituted a programme of Greek type development and, if so, how it came about; sections 6.2 to 6.5 consider the design process of each typeface separately, including an evaluation of each one; and section 6.6 provides a conclusion to the chapter.

6.1 Developing new Greek typefaces for photocomposition

In 1970, Mergenthaler's efforts to produce a commercially successful phototypesetter paid off with the Linofilm Variable Input Phototypesetter (V-I-P) (figure 6.1, page 124). Although the V-I-P was a second-generation analogue machine that used film segments to directly project images of photographic masters onto film or paper, it also incorporated a minicomputer which, by means of software, provided users with improved levels of typographic control. The result was that it enabled tasks to be accomplished with a higher degree of flexibility than was previously possible. The machine's success in medium- to large-size printing businesses and newspapers helped establish Linotype as a potent force in phototypesetting.²⁴⁵ Linotype, with encouragement from Costas Chrysochoides, was especially keen to promote the V-I-P in the Greek printing market; the phototypesetter was ideal for setting scripts that utilised multiple accents the way Greek did.²⁴⁶ As recalled by Matthew Carter, the V-I-P's stepping motor, which advanced the imaging of characters along a line, could accept a 'zero pulse' which would cause it not to advance. This allowed an accent to be keyed without causing an advance, so that the following character was superimposed to create the accented sort.²⁴⁷ Aware of the machine's technical advantages as well as its commercial potential in the Greek printing market, Mike Parker was keen to include a demonstration of the V-I-P at DRUPA in 1972.²⁴⁸

²⁴⁴ For details on all the Greek typefaces for photocomposition that were designed during that period as well as Linotype's plans to develop additional ones, see 6.1., page 131.

²⁴⁵ Wallis, *Typomania*, 74.

²⁴⁶ Carter, 'Which Came First, the Greeks or the Romans?', 97.

²⁴⁷ Carter, personal interview, 2 July 2014.

²⁴⁸ Mike Parker to Tage Bolander, 22 February 1972. Label V-I-P Products, File V-I-P Greek PF24-3/V-I-P/Products (Old)/Technical, Box 1, NMAH. DRUPA is an international print trade fair held every four years in Düsseldorf.



Figure 6.1. The Linofilm Variable Input Phototypesetter (V-I-P). The device was popular with medium- to large-size printing businesses and newspapers, and helped establish Linotype as a major manufacturer of phototypesetting equipment. It was also ideal for setting Greek as it enabled the easy centring of accents. From Wallis, *Typomania*, 52. 250% of original size.

ΜΗΝ ΚΟΥΡΑΖΕΣΘΕ, ΜΗΝ ΨΑΧΝΕΤΕ!!
 'Ο 'Οργανισμός LINOTYPE σκέπτεται, έρευνά για σάς. Και σκέπτεται ΣΩΣΤΑ!

Όχι πιά μέταλλο
 Όχι άνθρακινές συνθήκες
 Όχι μεγάλη δαπάνη αγοράς
 Όχι μεγάλη δαπάνη συντήρησης
 Όχι μεγάλο κόστος εργασίας

Αθήρβη λειτουργία
 Άκοπος χειρισμός
 Όλοκληρωμένη όργάνωση διορθώσεων
 Αυτόματες μεγεθών χαρακτήρων
 Αυτόματες στοιχειοθεσίες
 Άμεση, εύκολη έναλλαγή MEMONΩΜΕ-
 ΝΩΝ σειρών χαρακτήρων
 Άνάμειξη ειδών/μεγεθών χαρακτήρων
 Σύνοψη Έλληνικών/Ξενογλώσσων κειμένων
 ταυτόχρονα
 Αυτόματη άραιοσι/πίκνοση χαρακτήρων και
 λέξεων
 Πλήρη, δοκιμασμένα προγράμματα συλλαβισού
 Κανονικός τονισμός και μονοτονισμός
 Άριστη εμφάνιση έντυπων
 25 Άρατες σειρές Έλληνικών χαρακτήρων
 μέχρι σήμερα

**ΕΝΑ ΜΕΓΑΛΟ ΝΑΙ ΣΤΙΣ ΜΟΝΑΔΕΣ
 ΦΩΤΟΣΥΝΘΕΣΗΣ LINOTYPE**

Λειτουργούν σήμερα με εξαιρετική έπιτυχία 38 μικρές
 μεσαίες και μεγάλες μονάδες φωτοσυνθέσεως LINOTYPE

ΣΥΜΒΟΥΛΕΥΘΗΤΕ ΜΑΣ, ΖΗΤΗΣΤΕ ΝΑ ΣΑΣ ΕΠΙΣΚΕΦΘΟΥΜΕ

ΑΔΕΛΦΟΙ ΧΡΥΣΟΧΟΙΔΗ & ΥΙΟΙ ΚΟΛΟΚΟΤΡΩΝΗ 44 • ΤΗΛ. 3232.981 - 3237.701

Figure 6.2. Advertising placed by Costas Chryssochoides in *Η Τυπογραφία* (*The Typography*) in November 1976. The advertisement showcases the Linocomp, the V-I-P, and the Linotron 303. From *Η Τυπογραφία*, 15 November 1976, Issue 394, 4. 13% of original size.

‘We believe that the V-I-P is particularly well suited for Greek because it enables the operator to center piece accents with no extra keystroke. You make a keystroke for the accent and a keystroke for the character that follows it. The zero width for the accent triggers the centering mechanism.’²⁴⁹

Additionally, Linotype had developed CorRecTerm, a relatively inexpensive, free-standing CRT video terminal for text processing and typesetting applications. The terminal allowed for the reviewing and changing of text as well as showing the effects of the change at virtually any stage in the phototypesetting process.²⁵⁰ CorRecTerm worked in tandem with the V-I-P, and Linotype ensured that the terminal also functioned with Greek fonts.²⁵¹

At the same time, after the success of the Linotron 505,²⁵² Linotype in the UK was developing new CRT machines (see also footnote 189, chapter 5). In 1972 the company produced the Linotron 303. An improvement on the Linotron 505, the 303 was faster, more reliable and the quality of the type image was significantly better. It was also cheaper and could be used in businesses with smaller typesetting requirements easily as it was more economical when accepting the input of fewer keyboards than the high-speed 505.²⁵³ Galvanised by the popularity of Compugraphic Corporation’s low-cost phototypesetters (see 2.4), Linotype also launched the Linocomp 1, a direct-entry phototypesetter, in 1973. It was an affordable desktop device which derived character images from individual filmstrips held on a drum. The filmstrips had four type styles only, and point sizes were determined by two pre-focussed lenses. In the following year, the Linocomp 2, an improvement on the Linocomp 1, was announced. Linotype correspondence demonstrates that the Linotrons 505 and 303, the V-I-P, the Linofilm Super-Quick, and the Linocomp were phototypesetters sold and used in Greece in the 1970s.²⁵⁴ This is also supported by a number of adverts placed by Costas Chrysochoides in *Η Τυπογραφία* (*The Typography*) between 1976 and 1977 which prominently feature these devices (figure 6.2).

As already mentioned in 2.4, the restoration of democracy and the growth of the Greek economy in 1974 created more scope for advertising, direct marketing and publications of all kinds prompting the expansion of offset lithography and the increasing use of photocomposition. This can be seen in the classified ads pages of *Η Τυπογραφία* (*The Typography*) throughout the 1970s where an initially small but slowly growing number of businesses advertise their photocomposition services (see figure 2.1, chapter 2). The rise in Linotype’s machine sales in Greece is also reflected in the company’s correspondence: in 1973, Tage Bolander, Vice President and Director for Europe at MINT, touched upon the increasing number of photocomposition installations in a letter to the engineer Costas Makris who

²⁴⁹ Mike Parker to Costas Makris, 23 July 1973. Label V-I-P Products, File V-I-P Greek PF24-3/V-I-P/Products (Old)/Technical, Box 1, NMAH.

²⁵⁰ Seybold, 253-254.

²⁵¹ Mike Parker to Costas Makris, 23 July 1973.

²⁵² The Linotron 505 was a third-generation phototypesetter. In contrast to a second-generation machine, such as the Linofilm Super-Quick, the Linotron 505 did not expose type directly from photographic masters but reproduced them electronically on the surface of a cathode ray tube (CRT). As with second-generation devices, the Linotron 505 derived character images by scanning a photographic master stored on grids. The device was particularly suitable for newspaper production or otherwise large printing plants that dealt with the production of complex jobs such as telephone directories. See Seybold, 112.

²⁵³ Seybold, 135.

²⁵⁴ Mike Parker to P. Davies & Sons Printing House, 27 June 1974. File Foreign Miscellaneous, Box 3, NMAH.

had relocated to Athens from the U.S. in order to set up OrthoData Ellas Ltd., a company supporting computers and computer systems (see 2.4):

As you probably know, we have [sold] one Linotron 505, three V-I-P's and one Linofilm Super-Quick in Greece. In addition, we have quite a number of interesting [sales] prospects, in particular for the V-I-P.²⁵⁵

The growth in sales of photocomposition machines in the Greek market is also documented in the correspondence between Mike Parker and Derek Kyte, the technical director of Linotype-Paul in the UK, discussing the technical details of the Greek keyboard of the Linotron 303:

We've got an interesting situation in Greece. We seem to be getting essentially 100% of the market for Photocomp. With the change in government, we can expect the number of newspapers in Athens to grow from four to approximately 14 — and I sense the opportunity for some 303 sales. [...] Costas Chrysochoides is doing so well in Greece that we might get several 303's, particularly with the explosive growth of newspapers that can be expected to follow the recent change of government.²⁵⁶

In the event, the wholesale change to photocomposition in the newspaper industry did not occur until the early 1980s (see 2.4). Nonetheless, in order to assist with the sales of their phototypesetters in the Greek market, Linotype, which had already been expanding its type library through an ambitious programme of type development (see 3.1), began to plan the design of a number of new Greek typefaces specifically for photocomposition. That this was part of a programme of non-Latin development is supported by Linotype correspondence and other office documents. An excerpt from an undated typescript entitled 'The Standard V-I-P Library and how to order fonts' states that:

Mergenthaler is now expanding this library rapidly into a group of fonts of unparalleled diversity. Our ability to set non-roman designs ranges from Arabic and Hebrew through the Indian scripts to a wide range of Greek and Russian fonts.²⁵⁷

Linotype's definition of a programme of type design meant the development of particular typefaces that would help sell machines in a specific printing market. This is demonstrated by Mike Parker's discussion with Robert Caesar, Sales Director at Linotype-Paul, of a sales programme for photocomposition equipment outside newspaper production. Parker made it clear that he aimed to equip each phototypesetter to 'best suit its purpose', and that the typeface programme was different for each machine. Additionally, each typeface programme was based on the sales forecasts for specific printing markets:

If we are to go into this sort of business properly we need from you the work that I do here, i.e. a properly prepared typographic program indicating what faces must be prepared in order to sell machines in a given market — how many sales each can be expected to yield — plus an estimate of those typefaces which may be asked for but which are unnecessary because one of our existing

²⁵⁵ Tage Bolander to Costas Makris, 13 December 1973. Label V-I-P Products, File V-I-P Greek PF24-3/V-I-P/Products (Old)/Technical, Box 1, NMAH.

²⁵⁶ Mike Parker to Derek Kyte, 'Subject: 303 Greek Keyboard', 31 July 1974. File Linotype Paul/June 1973, Box 3, NMAH.

²⁵⁷ 'The Standard V-I-P Library and how to order fonts'. Undated typescript. Label V-I-P Products, File Fonts and Layouts, Box 1, NMAH.

typefaces can be made to substitute instead. This I do for the North American and Canadian markets. [...] We work in close cooperation with Taje Bolander and MINT to develop programs for Mergenthaler International in Europe before sales begin.²⁵⁸

Furthermore, Parker was more specific as well as explicit in his correspondence with Costas Makris (see 2.4). Whilst expounding on the suitability of the V-I-P for the setting of Greek, he clearly expressed his intention to support the sales of the phototypesetter by creating suitable Greek typefaces:

I was talking to Jack Konigsberg the other evening and he tells me that you're the man who made TXT. [...] He also told me you left Intertype and had gone to Greece possibly to set up in the typesetting business. This interests me — because we believe that the V-I-P is the best possible machine for setting Greek. I have been interested enough to make in the last two years four new Greek typefaces in complete series, with at least a couple of more to come. These are: Times Greek; Times Italic Greek; Caledonia Greek; Caledonia Bold Greek; Optima Medium Greek; Optima Medium Italic Greek; Optima Black Greek; Helvetica Greek; Helvetica Italic Greek; Helvetica Bold Greek. [...] An opportunity to properly equip a machine for the Greek market only comes two or three times a century. We see the opportunity for the V-I-P. We aim to make it the standard for typesetting in Greece. We will do whatever we should in typefaces, hyphenation programs, etc. to see that this comes about.²⁵⁹

In order to develop a programme of Greek type development, decisions had to be made regarding which typefaces to include. To this end, Matthew Carter and Mike Parker embarked on a series of trips to Athens in order to meet with Costas Chrysochoides and his clients — printers, typographers, typesetters, book publishers and newspaper editors²⁶⁰ — to gauge their opinions and preferences.²⁶¹ The presence of both Carter and Parker in Athens was important: it demonstrated Linotype's interest in the Greek printing market and the company's intention of developing appropriate Greek typefaces. In his correspondence to Chrysochoides, Parker clearly outlined the objectives of one such trip that took place between 7 and 10 July 1974:

We would like to see all the existing customers who are concerned with type design, plus any new prospects that you consider important. We would like to achieve the following:

- Educate ourselves with detailed criticism of the letterforms of the two new alphabets we have proposed.²⁶²
- Discuss with your customers possible further expansion of the library into new Greek letterforms.

²⁵⁸ Mike Parker to Robert Caesar, 7 June 1971. Folder 30, Photocomposition, WTC, DTGC.

²⁵⁹ Mike Parker to Costas Makris, 23 July 1973.

²⁶⁰ Carter, 199.

²⁶¹ Carter, personal interview, 2 July 2014.

²⁶² Judging from Carter's handwritten notes of the same period, contained in the Linotype Greek Archive, the 'two new alphabets' that Parker mentioned most likely refer to Helvetica Greek Condensed and Times Greek No.2 which was redrawn in 1975 by licensing Monotype's 565, 566, 567 and 667 series. No archival information has been found concerning the design of Helvetica Greek Condensed — see 5.3. Times Greek No.2 was a typeface which had already been used extensively in Greek hot-metal composition. As its initial adaptation from hot-metal to photocomposition had not been very successful, it was redrawn.

- Assist you to sell machines by demonstrating Mergenthaler's interest in the Greek market by our presence and by our questions.²⁶³

The requests Carter and Parker received were for typefaces suitable for the bilingual typesetting of books and other documents where the Greek text was set side-by-side with the Latin, and clients stressed the need for a balance between the Latin and Greek typefaces.²⁶⁴ A Greek type development programme was formulated lasting approximately ten years, from 1972 until 1980, and the typefaces that were produced, in chronological order, were: Optima Medium Greek (1972-73); Cadmus (1974); Century Schoolbook Greek (1976-77); and Baskerville Greek (1978). With the exception of Optima Medium Greek whose design was based on development work done by Hermann Zapf, the primary designer for all the typefaces was Matthew Carter. The information that has been found on the design development of these typefaces is fragmentary. However, there are enough archival sources to help to put together a partial picture as well as to enable their evaluation. All the typeface evaluations in this chapter employ the criteria used in chapters 3 and 5 for Caledonia and Helvetica Greek respectively, and include the consistency of characters in relation to each other, the readability of the typeface as a whole and its harmonisation with their Latin counterparts.

Finally, during that decade, development work was also undertaken on a number of other Greek type development projects: the Helvetica Greek family was extended by the addition of a condensed (1975-76) and a light style (1979); an inclined style was added to Caledonia Greek; Times Greek (1970) and Greek No.2 (1978) were redrawn — the former by Stempel and the latter by Mergenthaler by licensing the drawings of Monotype series 90, 91 and 92; and Souvenir Greek was designed, also by Matthew Carter.²⁶⁵ Moreover, there were plans for more Greek typefaces to be designed, which included: Helvetica Black Greek; Cooper Black Greek; Avant Garde Greek; Clarendon Bold Condensed (capitals only); Antique Olive Nord Greek (capitals only); and a redesign of the Greek Metro series including Metrolight and Metromedium Greek.²⁶⁶ However, as the extant archival sources on these typefaces are negligible, an in-depth discussion regarding their development is not possible in this thesis.

6.2 Optima Medium Greek

The design process of Optima Medium Greek and its subsequent evaluation set out below are based on limited archival sources that include a small amount of extant correspondence and text setting trial proofs. Optima Medium Greek was the first typeface to be developed after the completion of Helvetica Greek in 1971, and had been APC's second choice after Helvetica (see 5.2). The design of Optima Medium Greek was based on 48-point type drawings provided by Hermann Zapf, the designer of the Latin Optima, to Matthew Carter.²⁶⁷ Carter adapted Zapf's designs to Linotype's specifications, and additionally created Optima Medium Greek Italic and Optima Black Greek. Before he completed the typeface in 1973, Optima Medium

²⁶³ Mike Parker to Costas Chrysochoides, 17 June 1974. File Foreign Miscellaneous, Box 3, NMAH.

²⁶⁴ Hoffman, Phyllis R., *Matthew Carter Reflects on Type Design*. Unpublished MSc dissertation, School of Printing Management & Science, College of Imaging Arts and Sciences, Rochester Institute of Technology (RIT), Rochester, New York, 1999, 132.

²⁶⁵ 'Non-Romans, Greek, cont'd', office document, 20 March 1979. Unsorted, LGA, DTGC.

²⁶⁶ 'Plans for next Greek Typefaces', office document, 21 March 1979.

²⁶⁷ Hermann Zapf to Mike Parker, 21 May 1971. Unsorted, LGA, DTGC.

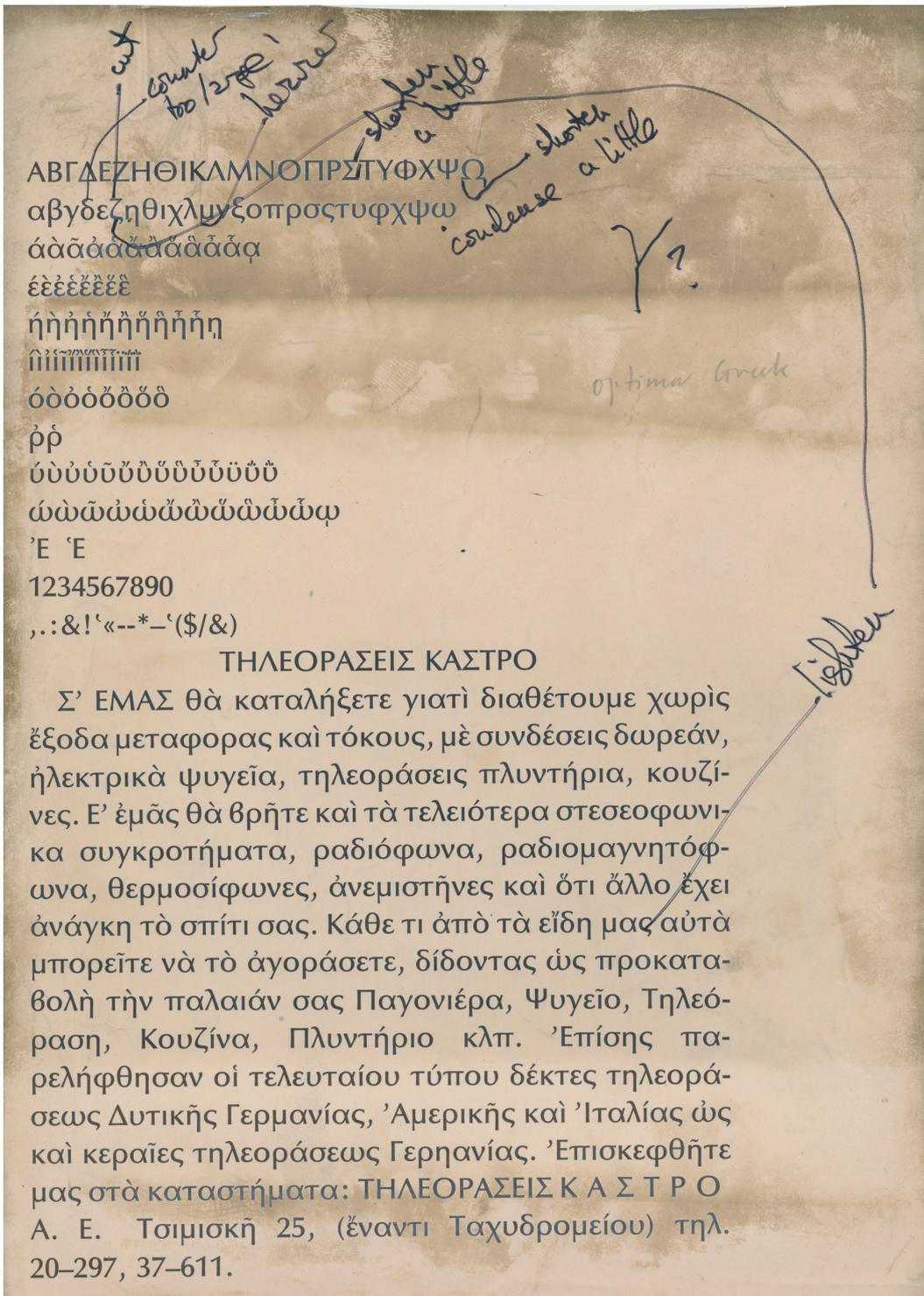


Figure 6.3. Bromide proof of Optima Medium Greek. The proof bears Mike Parker’s handwriting on it, marking the characters Costas Chrysochoides commented on at DRUPA. 1972. LGA, DTGC. 55% of original size.

Greek was showcased at DRUPA in May 1972, alongside demonstrations of the V-I-P.²⁶⁸ Comments on the design of the typeface that Costas Chrysochoides made to Mike Parker whilst at DRUPA were passed on to Matthew Carter the following month, June 1972 (figure 6.3). Chrysochoides's criticisms included the lowercase delta (δ), zeta (ζ), mu (μ), and gamma (γ), and the capitals sigma (Σ) and omega (Ω). More specifically:

- the top and bottom strokes of the uppercase sigma (Σ) were 'very slightly' too long, and Chrysochoides suggested that they be shortened and the character narrowed by a unit (see figure 6.3 and table 1, fourth row, page 134);
- the two horizontal tails of the uppercase omega (Ω) were 'slightly too long'. Chrysochoides asked whether these could be shortened 'very little' but suggested that the unit of the character should remain the same (as above).²⁶⁹
- in the lowercase delta (δ), the top curve 'swung too wide' and the counter appeared 'a little too large' (see figure 6.3 and table 2, first row, page 134);
- the horizontal stroke at the top of zeta (ζ) was 'slightly too low' whilst the weight of the bottom curve appeared 'a little too heavy' (as above);
- the descender of the lowercase mu (μ) was too light compared to other characters' descenders. Chrysochoides asked whether it should match the vertical stroke above it. Parker was in agreement with Chrysochoides on this point (see figure 6.3 and table 2, first row, page 134);
- the descender of gamma (γ) was originally designed in a way that resembled a Latin 'y'. Chrysochoides thought that the descender should be 'vertical underneath a v shape'. Parker also commented that it looked 'all wrong to my eye that is trained in the roman letters' (as above).²⁷⁰

Matthew Carter also received feedback from Walter Tracy. Tracy's comments, sent in early July 1972, were of a different nature. With the exception of the uppercase sigma (Σ), he concentrated on the details of different letterforms from those critiqued by Chrysochoides. Additionally, Tracy considered the typeface's overall texture and the ways in which some characters were likely to translate in different sizes or against the rest of the alphabet. In particular, his comments to Carter were as follows:

- the top counter in the uppercase alpha (A) was likely to 'close up in small sizes' (see figure 6.3 and table 1, first row, page 134);
- the centre strokes of the uppercase sigma (Σ) should extend 'a little more to the right' whilst the point of the angle 'should be a little lower' (see figure 6.3 and table 1, fourth row, page 134);
- in the uppercase phi (Φ), the vertical bar should be 'extended at the top and the bottom', and the ellipse made narrower to give the character better definition (as above);
- the bar of the uppercase psi (Ψ) be extended below the baseline in order to achieve optical alignment (see figure 6.3, page 132, and table 1, fourth row);
- the lowercase xi (ξ) seemed 'slightly too heavy against the rest of the lowercase' (see figure 6.3, page 132, and table 2, third row). [This is in contrast to Chrysochoides's

²⁶⁸ Mike Parker to Matthew Carter, 29 June 1972. File Matthew Carter, Box 3, NMAH.

²⁶⁹ Ibid.

²⁷⁰ Ibid.

TABLE 1 Optima Medium Greek and Latin uppercase characters

Optima Medium Greek (Proof)	Α	Β	Γ	Δ	Ε	Ζ	Η	Θ	Ι	Κ	Λ	Μ
Optima Medium Greek (Final)	Α	Β	Γ	Δ	Ε	Ζ	Η	Θ	Ι	Κ	Λ	Μ
Optima Medium Latin	A	B	F	V	E	Z	H	O	I	K	V	M
Optima Medium Greek (Proof)	Ν		Ο	Π	Ρ	Σ	Τ	Υ	Φ	Χ	Ψ	Ω
Optima Medium Greek (Final)	Ν	Ξ	Ο	Π	Ρ	Σ	Τ	Υ	Φ	Χ	Ψ	Ω
Optima Medium Latin	N	I	O	I	P	M	T	Y	O	X	I	O

TABLE 2 Optima Medium Greek and Latin lowercase characters

Optima Medium Greek (Proof)	α	β	γ	δ	ε	ζ	η	θ	ι		λ	μ
Optima Medium Greek (Final)	α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ
Optima Medium Latin	o	b	y	o			h		i	k	y	h
Optima Medium Greek (Proof)	ν	ξ	ο	π	ρ	σς	τ	υ	φ	χ	ψ	ω
Optima Medium Greek (Final)	ν	ξ	ο	π	ρ	ςσ	τ	υ	φ	χ	ψ	ω
Optima Medium Latin	v		o	i	p	o	i	u		y		

Tables 1 and 2. The first and fourth rows, in both tables, show the design of the characters of Optima Medium Greek as shown of the trial proof. The second and fifth rows, in both tables, depict the final iteration of the typeface. The third and sixth rows, in both tables, show the Latin Optima Medium.

comment on the lowercase zeta (ζ) above (see figure 6.3, page 132, and table 2, first row)];

- lowercase theta (θ) appeared ‘a little too prominent in some places’ (as above);
- lowercase sigma (σ) was not sufficiently different from lowercase omicron and Tracy suggested its top bar be longer (see figure 6.3, page 132, and table 2, third row);
- finally, lowercase pi (π) needed more space between the legs to ‘improve the fitting of this character’ (see figure 6.3, page 132, and table 2, third row).²⁷¹

Carter has stated that he did make revisions based on feedback as it tended to be ‘not very radical’.²⁷² However, an internal memo Carter addressed to Mike Parker on 10 August 1972 suggests that he may have filtered the comments he received. He stated that he had revised the following characters: uppercase sigma (Σ) and psi (Ψ) and lowercase mu (μ), alpha (α), gamma (γ), pi (π), alternate sigma (ς), xi (ξ) and zeta (ζ) (tables 1 and 2).²⁷³ This list did not include all the characters commented on, and suggests that Carter may have made his own choices about which letterforms to revise. Additionally, Carter also revised lowercase alpha and alternate sigma — two letterforms not commented upon by either Chryssochoides or Tracy. Comparing the trial text proof with the final version of Optima Medium Greek in the *Stempel Information* type specimen (tables 1 and 2), any revisions Carter may have done seem consistent with his comment or perception that they were not very radical; for example, sections of characters such as uppercase psi (Ψ) and lowercase xi (ξ), zeta (ζ) and (ψ) appear somewhat thinner, emphasising their contrast further. The letterforms that bear the most obvious changes are lowercase gamma (γ), mu (μ), alternate sigma (ς) and omega (ω) (table 2). All the other characters have more or less retained their original design, although comparisons cannot be made in the case of uppercase xi (Ξ) and the lowercase (κ) as they do not appear in the available trial text setting proofs.

As can be seen in table 1, the Greek uppercase letterforms are closely modelled on the equivalent Latin ones. Due to their inherent design similarities there is a high degree of conformity between them, and the Greek uppercase appears in its conventional form. There are significantly fewer correspondences between the Latin and Greek lowercases due to the latter’s greater variety of shapes, even though some Greek characters have been clearly modelled on Latin letterforms. For example, the Latin ‘y’ seems to be the model for at least three Greek characters: gamma (γ), lambda (λ) and chi (χ) (see table 2). Similar to Helvetica Greek, there are design inconsistencies between the lower terminals of zeta (ζ) and xi (ξ) with that of the final sigma (ς) (see table 2). These are not apparent among the three characters in the trial proof as Carter revised the design of the final sigma afterwards. Moreover, there is further disparity between the final sigma in the regular and black styles with the inclined style: the latter does not match the former ones (figure 6.4, page 136). It is difficult to speculate as to what could have been the cause of these differentiations without relevant archival sources coming to light.

The contrast of the Greek Optima characters does not match the corresponding Latin ones; the Latin Optima Medium has a lower contrast and, consequently, looks darker than the Greek. The Greek characters also have a more subtle contrast at the proof stage (figure

²⁷¹ Walter Tracy to Matthew Carter, ‘Optima Medium Greek’, 4 July 1972. File 20, Greek, WTC, DTGC.

²⁷² Carter, personal interview, 2 July 2014.

²⁷³ Matthew Carter to Mike Parker, ‘Optima Medium Greek’, memo, 10 August 1972. Unsorted, LGA, DTGC.

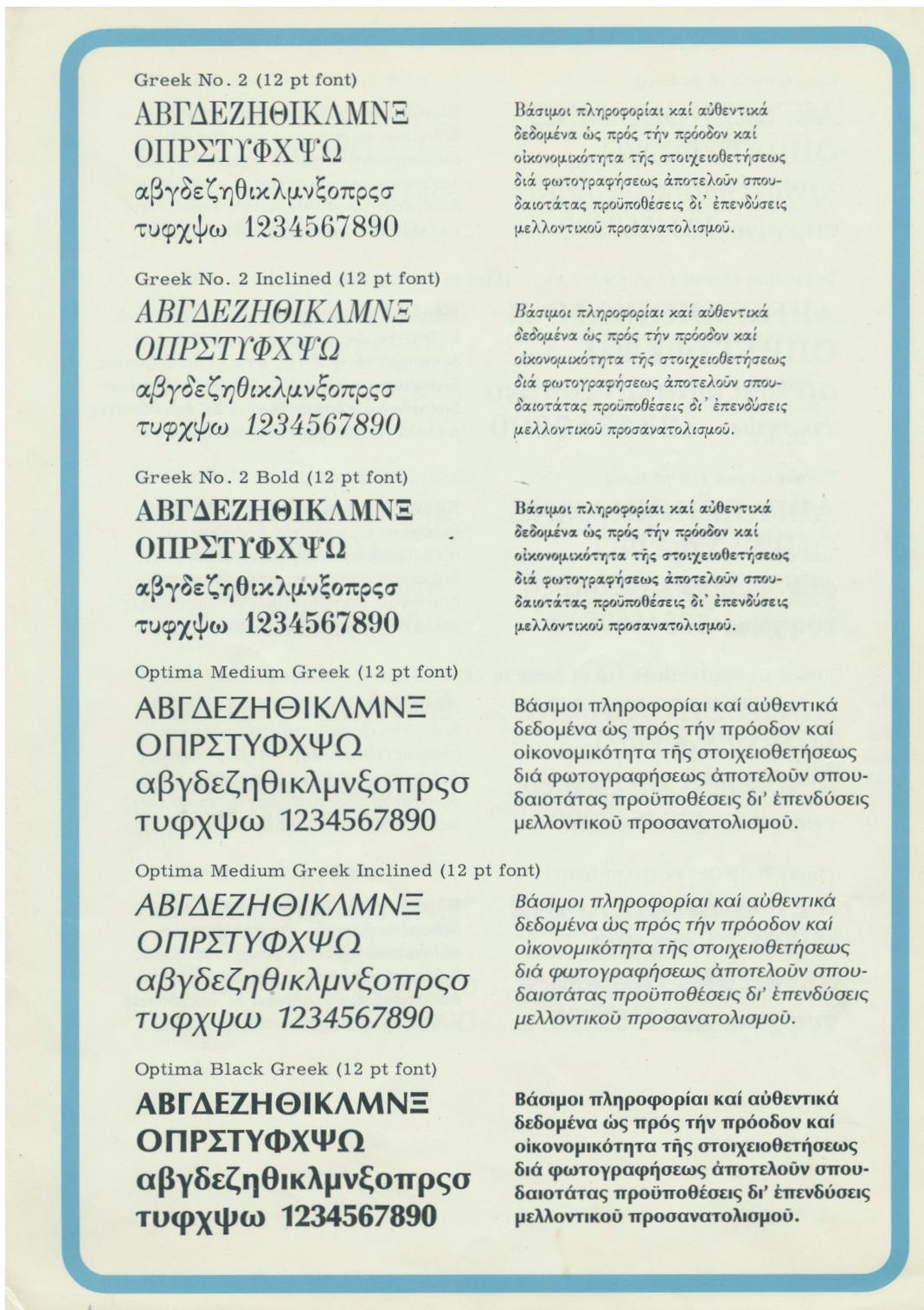


Figure 6.4. The final iteration of Optima Medium Greek, including inclined and black styles. From *Stempel Information Photocomp Type Faces* type specimen. 1980. LGA, DTGC. 68% of original size.

6.3, page 132). Moreover, the contrast between thick and thin strokes becomes higher in the final iteration of the typeface which made the characters — upper- and lowercase — look thinner compared to the equivalent Latin ones (tables 1 and 2, page 134). Unevenness in contrast also occurs among the Greek characters. For example, xi (Ξ) appears thinner among the other uppercase characters whilst eta (η) has less defined thick and thin strokes compared to the rest of the lowercase characters (tables 1 and 2, page 134). The design of accents has improved and is more consistent than those of Helvetica Greek, except for the circumflex which, like Helvetica Greek's, is disproportionately small compared to the characters (figure 6.3, page 132). Despite the obvious inconsistencies of its stroke modulation, Optima Medium Greek is a more consistent typeface than Helvetica Greek. There are fewer design disparities in the lowercase between its three different weights contributing to a more uniform style (figure 6.4). Overall, the lowercase characters are conventional and, as a result, they are legible contributing to the readability of the typeface.

6.3 Cadmus

Cadmus is noteworthy as it was a self-initiated, conscious effort by Matthew Carter to create an original Greek design free of Latin influence, and therefore contrary to Linotype client requirements and expectations at the time. Its style was different, and therefore did not fit comfortably in Linotype's Greek type development programme which consisted of adaptations of widely-used Latin typefaces. In commercial terms, the typeface was a failure; the Mergenthaler Company Records registered only a single sale to one Greek printing business in 1974, the year of its release. According to the available archival sources, Carter began to develop Cadmus on his own as early as 1972. After having the experience of designing Helvetica and Optima Medium Greek, he thought that there was more to Greek typography than the Latin adaptations he had been occupied with up to that point. In order to develop an entirely new Greek typeface, it felt logical to Carter to explore the script by going back to examine its prehistory, and he spent a long time researching before coming up with a design.²⁷⁴ From the beginning, he conveyed his ideas to Walter Tracy and Mike Parker, both of whom were supportive of his endeavours. Tracy, in discussing with Mike Parker the need to develop Greek typefaces to aid the sales of machines stated that:

I know Matthew is keen to try his hand on something original; he thinks it is pointless to choose eleven existing roman caps and a lowercase o and add a mass of Greek sorts to them. I agree, I also think that, as in roman text faces nowadays, ample colour would be desirable.²⁷⁵

Parker concurred, responding:

I agree with you exactly about an original Greek. I have encouraged Matthew to make a few sketches so that we can define the project and get started.²⁷⁶

In July 1972, Carter showed an early text setting proof of the new design to Walter Tracy, which was provisionally entitled 'New Greek Typeface' (figure 6.5). Its design took a radical approach to the design of the descenders of zeta (ζ) and xi (ξ) and the ascender of delta (δ) by omitting them entirely (figures 6.6-6.8, page 140). Additionally, lowercase epsilon (ε) (figure

²⁷⁴ Mike Parker to Matthew Carter, 'New Greek Typeface', 11 April 1973. File Matthew Carter, Box 3, NMAH.

²⁷⁵ Walter Tracy to Mike Parker, 'V-I-P and 505', 24 April 1972. File 30, Photocomposition, WTC, DTGC.

²⁷⁶ Mike Parker to Walter Tracy, 11 May 1972, File 30, Photocomposition, WTC, DTGC.

6.6, page 140) and mu (μ) (figure 6.7, page 140) are evocative of the lettering on Greek ceramic vases, whilst lowercase rho (ρ) (figure 6.8, page 140) resembles a Latin ‘p’. Tracy’s comments are minimal and are the only extant feedback. He suggested that Carter reduce the length of the Greek ascenders and descenders, which were normally longer than those in the Latin script, as well as the height of the Greek capitals, in order to make the texture of the text more regular.²⁷⁷

The name of the typeface was settled in December 1974. Mike Parker wrote to Costas Chrysochoides that Carter and himself had decided on ‘Cadmus’ which had suitable connotations and matched the look of the typeface which was reminiscent of Greek inscriptions.²⁷⁸ The Mergenthaler Company Records document that Cadmus’s only sale was processed in August 1974.²⁷⁹ Parker communicated this to Carter thus:

I have in front of me a font order from VASILIKI Andreopoulou — Athens. It includes your new face. You will no doubt be pleased to hear that it is identified as “New Archaic”.²⁸⁰

In August 1974, although the typeface had not been named, the client had identified the origin of the design, which also appears to have been the source of its commercial unpopularity. Having been a self-initiated project which he spent a considerable time researching, Carter must have been greatly disappointed. Nonetheless, Carter has acknowledged the lack of success that Cadmus had:

I had designed a Greek face myself just on my own initiative — it was not based on a Latin model. It failed tremendously, I don’t think anybody bought a single font of it because they thought it was archaic — but that’s another story.²⁸¹

Elsewhere he elaborated further:

In my desire to make a Greek face that was free of Latin influence, I succeeded in giving it an archaic look, unwelcome in the westward-looking Greece of the 1970s. It suffered too from not having a Latin sister because bilingual composition was a big issue at the time.²⁸²

Carter was correct in his assessment of the failure of the typeface. In the progressive, forward-looking social and political climate fostered after the dictatorship, and with the expansion of offset litho printing and photocomposition, there was no place in Greek typography for such a decisively un-modern typeface (see 2.4). In contrast, the quest for modern, western-influenced typographic standards were encapsulated by APC’s commission of the design of Helvetica Greek. Cadmus, despite Carter’s good intentions, symbolised the past; its design influences are too obvious making its uses rather limited. Although the shapes of individual characters have a pleasing unmodulated simplicity, when assembled as text the effect is slightly jarring. From all the Greek typefaces Carter designed in the 1970s, Cadmus is the least readable, especially its lowercase; the uncommonly short ascenders

²⁷⁷ Walter Tracy to Matthew Carter, 6 July 1972. Label V-I-P Products, File New Gr Type/V-I-P Products (Old)/Technical, Box 1, NMAH.

²⁷⁸ According to Greek mythology, Cadmus was the founder and first King of Thebes. Mike Parker to Costas Chrysochoides, 11 December 1974. File Foreign Miscellaneous, Box 3, NMAH.

²⁷⁹ ‘Non-Romans, Greek, cont’d.’, office document, 20 March 1979.

²⁸⁰ Mike Parker to Matthew Carter, 6 August 1974. File Matthew Carter, Box 3, NMAH.

²⁸¹ Hoffman, 135.

²⁸² Re, Margaret, *Typographically Speaking. The Art of Matthew Carter*, (New York: Princeton Architectural Press, 2003), 41.

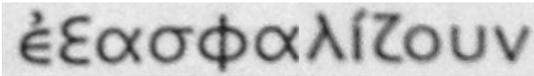


Figure 6.6. Examples of Cadmus lowercase epsilon (ε), xi (ξ) and zeta (ζ). Undated. NMAH. 206% of original size.

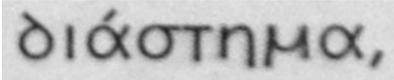


Figure 6.7. Examples of Cadmus lowercase delta (δ) and mu (μ). Undated. NMAH. 206% of original size.

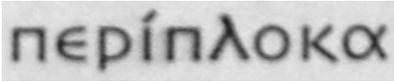


Figure 6.8. Examples of Cadmus lowercase rho (ρ). Undated. NMAH. 206% of original size.

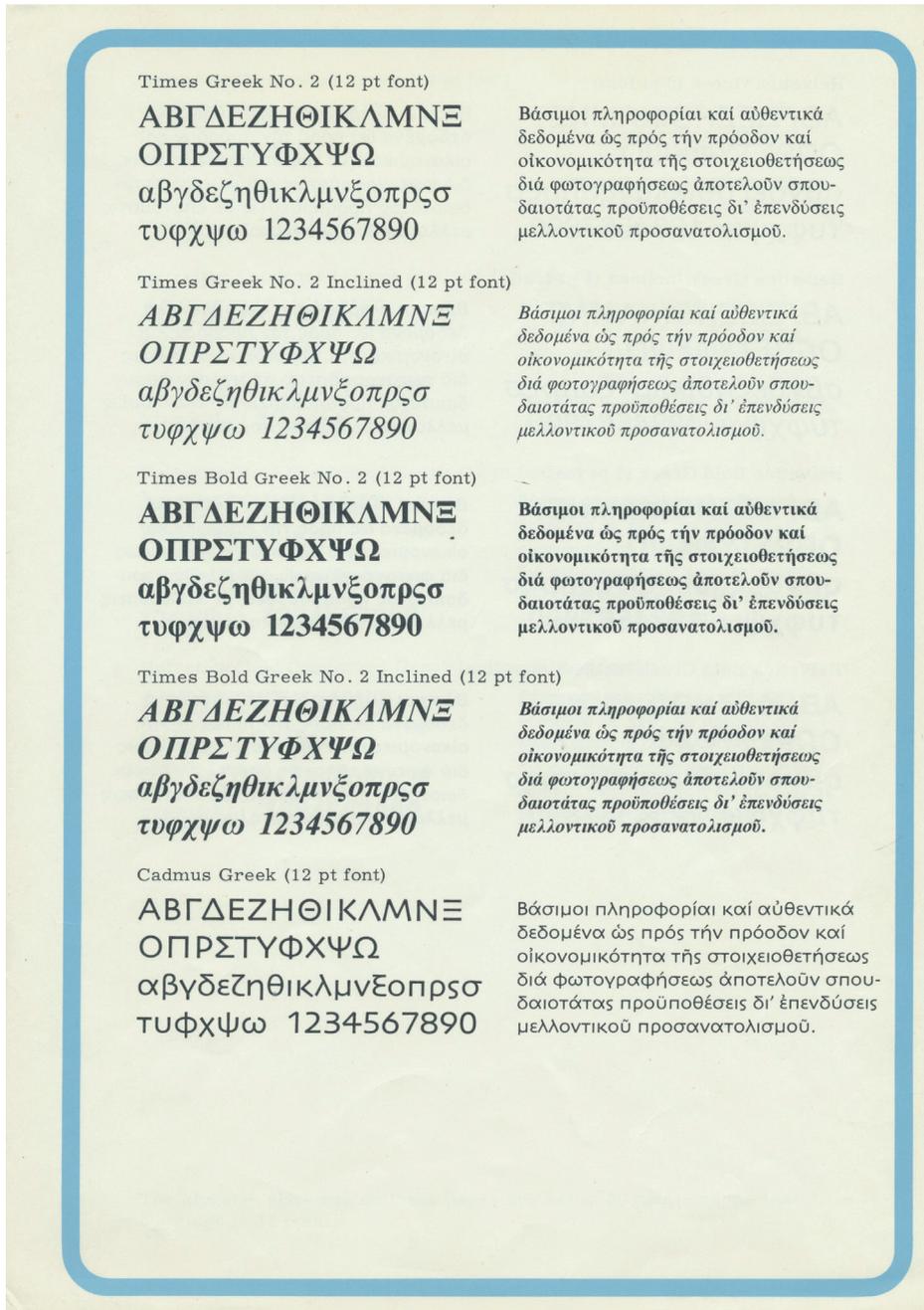


Figure 6.9. The final iteration of Cadmus. Text set in the typeface is less readable than text set in Times No. 2 directly above it due to Cadmus's unusually short ascenders and descenders, and the roundness of its characters. Also, the characters delta (δ), mu (μ), xi (ξ) and rho (ρ) have been modified to more conventional shapes in comparison to those seen in figures 6.6, 6.7 and 6.8. From *Stempel Information Photocomp Type Faces* type specimen. 1980. LGA, DTGC. 59% of original size.

and descenders, and the overall roundness of the typeface do not make the characters very legible, for example when compared to those of Times Greek No. 2 (figure 6.9). In the final iteration of the design, Carter has revised the lowercase mu (μ) and rho (ρ) to a more modern shape and cursive shapes than originally seen in the trial text proof. Both are improvements, although their descenders remain unusually short (see table 3, page 138, and figures 6.7 and 6.8 respectively). The lowercase zeta (ζ) and xi (ξ) appear to aspire to a formal minimalism, however omitting their descenders leaves out important components of the letterforms and makes them look half-finished (table 3, page 138).

Nevertheless, Cadmus represents an interesting counterpoint to the rest of the Greek typefaces Carter designed in the 1970s. It testifies to Carter's thoughtfulness as a type designer in perceiving the need for original Greek type designs independent from the Latin typographic tradition, and closer to the culture of the users for whom they were intended. Had the look of Cadmus not been 'archaic', it might have been easier for Carter to make a more convincing case for original Greek typefaces instead of the Latin adaptations he was engaged in.

6.4 Century Schoolbook Greek

Matthew Carter and Mike Parker undertook to design Century Schoolbook Greek after one of their trips to Athens to meet with Costas Chrysochoides and his clients. Carter recalled that one client in particular, the printer Grigoris Tsiveriotis who was more outspoken than most,²⁸³ was amongst those who argued decisively for an adaptation of Century Schoolbook for Greek.²⁸⁴ Carter designed the typeface between 1975 and 1977,²⁸⁵ and this time he had the assistance of Tim Holloway, a young British type designer who had previously worked under Walter Tracy at Linotype-Paul. Since his relocation to London in 1971, Carter was a self-employed type designer although he continued to work exclusively for Linotype. Both designers worked from their respective homes — Carter in Blackheath and Holloway in Sleaford, Lincolnshire — and part of their communication was conducted through correspondence.²⁸⁶ The first trial text setting proofs of Century Schoolbook Greek were produced in 1976, and Mike Parker sent them to Costas Chrysochoides in Athens on 15 March that year. In the accompanying letter, Parker clarified that the proofs included alternative forms for some of the lowercase characters and asked for Chrysochoides's feedback:

'The two lowercase alphabets at the head of the enclosed specimen will show you the various alternatives. These have been used to set the paragraphs marked 'First version' and 'Second version' below. We have set the face in an all-Greek text and also mixed with Century Schoolbook Roman to show how the two fonts combine. [...] I hope you will show the specimen to Sophia

²⁸³ According to the type designer Takis Katsoulidis, Grigoris Tsiveriotis was one of the first printers in Athens to adopt photocomposition (see also footnote 180), and in the early 1980s he took over the printing of *Ελευθεροτυπία* (*Eleftherotypia*), a leading national daily (see 2.4). Tsiveriotis's name is also recorded in Linotype correspondence in connection to his purchasing a V-I-P in the mid-1970s. Katsoulidis, personal interview, 13 July 2017.

²⁸⁴ Carter, personal interview, 2 July 2014.

²⁸⁵ 'Plan for next Greek Typefaces', office document, 21 March 1979. The release of the typeface came in stages; Century Schoolbook Greek and Schoolbook Greek Italic were released in September and November 1976 respectively, whilst Century Schoolbook Greek Bold was released in May 1977.

²⁸⁶ Matthew Carter to Tim Holloway, 'Baskerville Greek Upright', 26 January 1977. Unsorted, LGA, DTGC.

Century Schoolbook Greek (Proof)	A	B	Γ	Δ	E	Z	H	Θ	I	K	Λ	M
Century Schoolbook Greek (Final)	A	B	Γ	Δ	E	Z	H	Θ	I	K	Λ	M
Century Schoolbook Latin	A	B	F	V	E	Z	H	O	I	K	V	M
Century Schoolbook Greek (Proof)	N	Ξ	Ο	Π	Ρ	Σ	Τ	Υ	Φ	Χ	Ψ	Ω
Century Schoolbook Greek (Final)	N	Ξ	Ο	Π	Ρ	Σ	Τ	Υ	Φ	Χ	Ψ	Ω
Century Schoolbook Latin	N		O	I	P		T	Y	I	X	I	O

Table 4. The table shows the Century Schoolbook Greek uppercase characters as seen on the trial proof (first and fourth rows), and in their final iteration (second and fifth rows). Their designs are compared against the uppercase characters of the Latin Century Schoolbook (third and sixth rows).

(I believe she was among those who recommended that Century Schoolbook should have a companion Greek); we have found her judgement of letterforms very reliable in the past.’²⁸⁷

The above excerpt implies that, having successfully worked with Sophia Zarabouka for the design of Helvetica Greek, both Parker and Carter subsequently consulted with her whilst deciding which typefaces to adapt for Greek. Zarabouka does not remember whether she gave feedback on this or any other of the typefaces that are included in this chapter, and it has not been possible to verify through the available archival sources whether Chrysochoïdes showed her the proofs of Century Schoolbook Greek. The two versions of the lowercase alphabet that Chrysochoïdes saw included alternate forms for the following characters: alpha (α), beta (β), eta (η), theta (θ), xi (ξ), pi (π), upsilon (υ), phi (φ) and chi (χ) (table 5, page 144). Chrysochoïdes, in a reply to Parker dated 9 June 1976, expressed his preference for the ‘first version’:

The common result of the investigation made among many customers and prospectives [sic] gave preference to the alphabet of the first version. [...] Therefore you can proceed accordingly and advise us when do you expect that the upright, italic and bold will be ready.²⁸⁸

Although there is no recorded feedback, it appears that some letterforms were revised. The *Stempel Information* type specimen shows that the final iteration of Century Schoolbook Greek is almost identical with the ‘first version’ lowercase character set. The only change has been to lowercase beta (β) which was replaced by its alternate form from the ‘second version’ lowercase alphabet (table 5, page 144). The typeface was the first serified Greek that Carter designed, citing it as a good example where the two typefaces, the Latin original and its Greek adaptation, were so alike to the extent that it was difficult to tell them apart just by casting a casual glance (figure 6.10, page 144).²⁸⁹ Carter’s statement is indeed true. The design of Century Schoolbook Greek has been based on the letterforms of its Latin counterpart to a far greater extent than was the case with Caledonia, Helvetica and Optima Greek. As shown in tables 5 and 6 (page 142 and 144 respectively), a large number of both uppercase and lowercase characters are the products of modifications of the equivalent Latin Century Schoolbook characters. Regarding the uppercase, many Greek and Latin characters are the same or similar in structure therefore one expects a large degree of conformity between them. However, as table 5 (page 144) demonstrates the inherent cursiveness of the lowercase has been almost entirely jettisoned for a more upright style consisting of a greater number of horizontal, vertical and diagonal strokes. The inclusion of serifs, when traditionally Greek lowercase characters have none, further reinforces features that are inherently part of the Latin lowercase. Some of the most prominent examples include gamma (γ), eta (η), iota (ι), kappa (κ), and mu (μ). Other lowercase characters have been created by modifying or combining Latin lowercase letterforms. Some examples include: alpha (α) combines ‘o’ with the tail from the ‘a’; rho (ρ) appears to be a combination of ‘o’ and ‘p’; beta (β) is based on ‘p’; gamma (γ), lambda (λ) and chi (χ) are based on ‘y’; eta (η) and mu (μ) are based on ‘n’ (table 5). The lack of archival sources documenting the design process as well as any feedback

²⁸⁷ Mike Parker to Costas Chrysochoïdes, ‘Subject: Century Schoolbook Greek’, 15 March 1976. File Foreign Miscellaneous, Box 3, NMAH.

²⁸⁸ Costas Chrysochoïdes to Mike Parker, ‘Century Schoolbook Greek’, 9 June 1976. Unsorted, LGA, DTGC.

²⁸⁹ Carter, ‘Which Came First, the Greeks or the Romans?’, 199.

TABLE 5 Century Schoolbook Greek and Latin lowercase characters												
Century Schoolbook Greek (Version 1)	α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ
Century Schoolbook Greek (Version 2)	α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ
Century Schoolbook Greek (Final)	α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ
Century Schoolbook Latin	a o	p	y	o			n		i	k	y	n
Century Schoolbook Greek (Version 1)	ν	ξ	ο	π	ρ	σς	τ	υ	φ	χ	ψ	ω
Century Schoolbook Greek (Version 2)	ν	ξ	ο	π	ρ	σς	τ	υ	φ	χ	ψ	ω
Century Schoolbook Greek (Final)	ν	ξ	ο	π	ρ	ςσ	τ	υ	φ	χ	ψ	ω
Century Schoolbook Latin	v		o	i	op	ao	t	u		y	I	

Table 5. The table shows: the ‘first version’ Century Schoolbook Greek lowercase characters (first and fifth rows); the ‘second version’ Century Schoolbook Greek lowercase characters (second and sixth rows); and Century Schoolbook Greek in its final iteration (third and seventh rows). Their designs are compared against the lowercase (and uppercase) characters of the Latin Century Schoolbook (fourth and eighth rows).

Omnium maxime πάντων μάλιστα, ὑπὲρ πάντα ἄλλον.
 Quem ad diligeret ποῖον ἠγάπα. Ἐτέθη ὑποτακτ., διότι
 εἶναι πλαγία ἐρώτησις. Fratrem (ένν. diligo omnium
 maxime). Secundum κατηγορ. Iterum πάλιν, τὸ δεύτε-
 ρον. Tertio ἐκ τρίτου, τὸ τρίτον (ένν. quem diligeret).

Figure 6.10. An example of Century Schoolbook Latin and Greek mixed typesetting from trial typesetting proofs. Undated. LGA, DTGC. 120% of original size.

received from Chrysochoides and his clients makes it difficult to ascertain whether the visual look of Century Schoolbook Greek was the result of specific brief requirements or decisions arrived at by Carter. Nonetheless, judging from the extant material, the inclusion of serifs in the Greek lowercase not only imposes an obvious Latin influence but also reduces its readability; the rhythm and distinctive features of Greek characters have been either eliminated or significantly modified in order to match its Latin counterpart. This is in contrast to the Latin Century Schoolbook whose refined design, ball terminals and finely tapered strokes make for a highly readable typeface. In the end the Latin original and its Greek adaptation do not seem to share a harmonious balance between them. Next to the Latin Century Schoolbook, the Greek looks idiosyncratic and unbalanced.

6.5 Baskerville Greek

Carter and Holloway started work on Baskerville Greek in 1976 whilst Century Schoolbook Greek was being completed. It is unclear from archival sources how or by whom this project was initiated. However Carter, along with Mike Parker, presented a first iteration of Baskerville Greek in Athens in January 1977. Carter reported to Holloway that, although there were some criticisms of a few characters,²⁹⁰ the typeface was well received.²⁹¹ A small number of trial text setting proofs exist. However, as they are all undated it is difficult to determine at what stage in the design process they were produced, and whether any of them were shown at the time of the presentation in Athens. Nevertheless, a list compiled by Tim Holloway in September 1977 indicates that overall twenty-two characters were revised and friskets re-cut.²⁹² Of these, two were uppercase characters, sixteen were lowercase and the remaining four were accents. Specifically:

- Uppercase: theta (Θ) and xi (Ξ).
- Lowercase: alpha (α), beta (β), gamma (γ), zeta (ζ), eta (η), theta (θ), iota (ι), kappa (κ), lamda (λ), nu (ν), xi (ξ), rho (ρ), sigma with its alternate form (σ, ς), phi (φ) and chi (χ).
- Accents: 

Revisions to the Baskerville Greek characters and design work on Baskerville Greek Inclined continued from the autumn of 1977 until the spring of 1978, in anticipation of Parker's visit to Athens for another round of presentations at the end of April.²⁹³ New Baskerville Greek friskets²⁹⁴ were cut at Mergenthaler in New York in March 1978, but they contained 'some misalignments and wrong-font accents'.²⁹⁵ The following month, the drawings for Baskerville Greek Inclined were also sent to Mergenthaler for frisket cutting and manufacture. Friskets for Baskerville Greek Bold were cut at Linotype-Paul in London, and

²⁹⁰ In a letter written in 1978, Carter states that these criticisms were from the printer Grigoris Tsiveriotis and, as a result, he and Holloway revised twenty-two characters. Matthew Carter to Lennie Battipaglia, 28 November 1978. Unsorted, LGA, DTGC.

²⁹¹ Matthew Carter to Tim Holloway, 'Baskerville Greek Upright', 26 January 1977.

²⁹² Holloway, Tim, 'Baskerville Greek Upright', office document, 24 September 1977. Unsorted, LGA, DTGC.

²⁹³ Matthew Carter to Tim Holloway, 2 March 1978. Unsorted, LGA, DTGC.

²⁹⁴ Friskets were used as negatives in the production of typefaces for photocomposition. They were made from transparent laminate, covered on one side with rubilith film. On the film, the outline of an enlarged character was cut out with a scalpel revealing its shape against a red background.

²⁹⁵ Matthew Carter to Lennie Battipaglia, 28 November 1978.

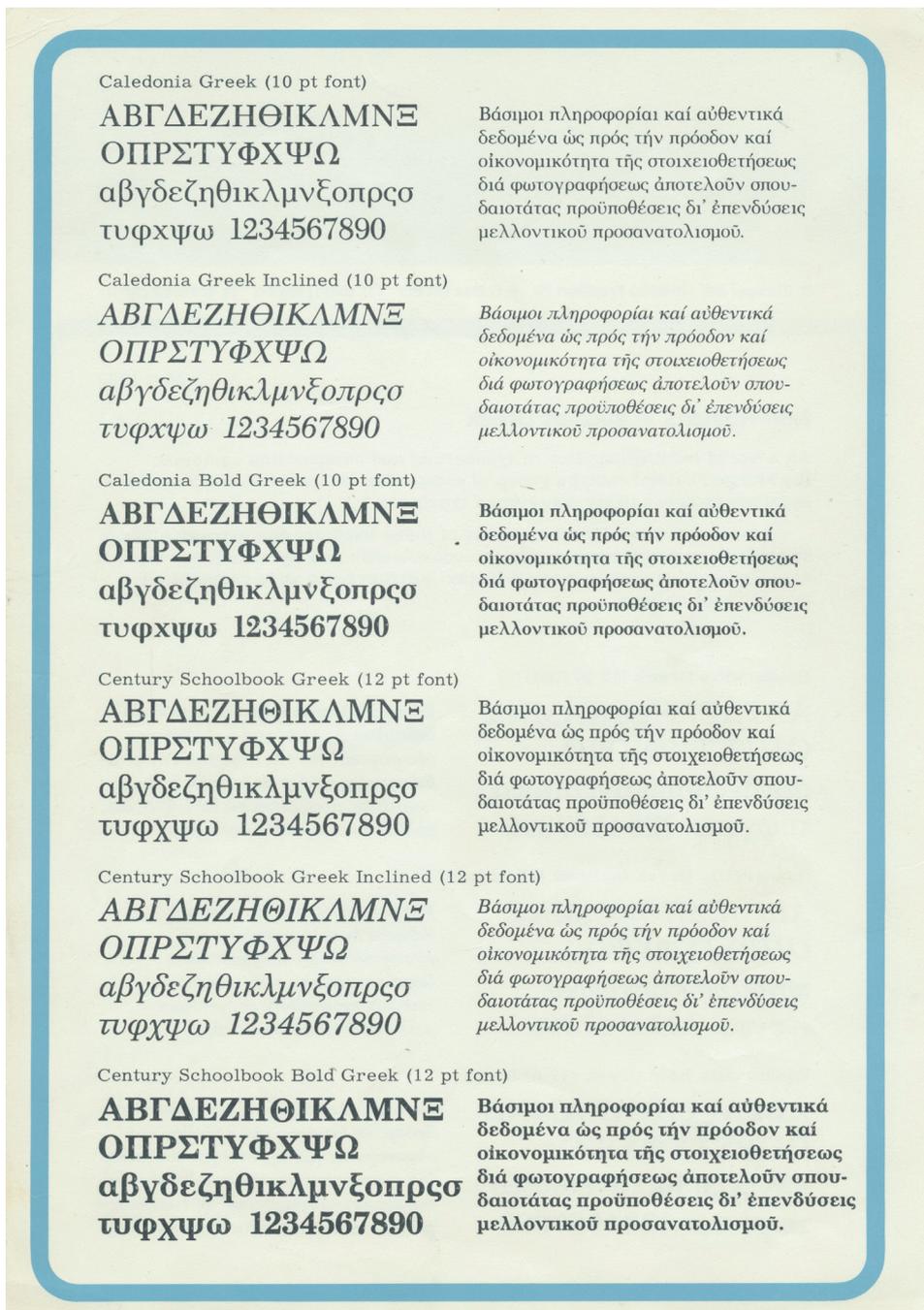


Figure 6.11. The final iteration of Century Schoolbook Greek which is identical with the 'first version' of the typeface during the proof stage. From *Stempel Information Photocomp Type Faces* type specimen, 1980. LGA, DTCC. 60% of original size.

subsequently sent to Mergenthaler by Carter.²⁹⁶ Proofs for all three fonts were not sent to Carter until January 1979. There were still errors in the Baskerville Greek and a number of oddities in the Baskerville Greek Inclined, ‘some due to drawing, some to manufacture’. Therefore, it does seem unlikely that Parker presented the typeface in Athens in April 1978, if indeed the meeting went ahead. Carter confirmed in January 1979 that Chryssochoides and his customers had still not seen Baskerville Greek Inclined in order to suggest improvements — in which case it is also unlikely that they had seen the revised Upright either.²⁹⁷

Eventually, Carter himself presented the typeface in Athens in March 1979, and afterwards he was in a position to make final revisions. Most of them, if not all, were due to the manufacturing process: the letter zeta (ζ) in the Baskerville Greek needed to be corrected as it was ‘out of position on the font’; a lowercase accent was too high and the iota subscript was accidentally ‘opaqued’ causing it to disappear when typeset; and four lowercase characters (ζ, θ, ξ and ς) were ‘either too light or too heavy’ for which he provided new drawings so that new friskets could be cut at Mergenthaler.²⁹⁸ Linotype office documents record that Baskerville Greek, including the italic and bold styles, were released in April 1978.²⁹⁹ However, given the ongoing revisions documented in the correspondence it seems unlikely that this was the case, and that the release was, in all likelihood, in 1979.

In July 1980, having received the *Stempel Information* type specimen, Costas Chryssochoides took the opportunity to write to Stempel requesting yet more changes to the design of several letterforms of Century Schoolbook and Baskerville Greek (figure 6.13, page 152). In particular, he asked whether the serif in the descender of the lowercase eta (η) should be eliminated even if mu (μ), rho (ρ), phi (φ) and psi (ψ) continued to retain theirs. Furthermore, he recommended that, in the Baskerville Greek Inclined, ‘the end of the second leg of the η [lowercase eta] would better be not so much bent’.³⁰⁰ Stempel passed on these comments to Matthew Carter whose response betrayed a certain amount of exasperation:

It’s damn annoying to have these criticisms of our Greek designs from Costas so long after he has seen the faces, and indeed sold fonts of them. [...] Whether we should remake the fonts with the suggested corrections at this stage is really a policy matter for Mike [Parker] to decide. I cannot really judge how serious the criticisms are from the design point of view, but I do wonder why the η [eta] in Baskerville Greek Inclined is wrong while the η [eta] in Century Schoolbook Greek Inclined is drawn the same way and is evidently acceptable. I will discuss all this with Mike on the phone when I get the chance.³⁰¹

It is intriguing that Chryssochoides wrote to Stempel in Germany and not directly to Mike Parker at Mergenthaler who, along with Carter, handled the project. Extant Linotype correspondence does not document a response from Mike Parker to Chryssochoides’s comments, or provide clues as to whether any design revisions were made. The iteration of Baskerville Greek in the *Stempel Information* type specimen in comparison to the extant trial proofs does not show any discernible differences — lowercase eta (η) retains its serif — and

²⁹⁶ Ibid.

²⁹⁷ Matthew Carter to Lennie Battipaglia, ‘Baskerville Greek’, 8 January 1979. Unsorted, LGA, DTGC.

²⁹⁸ Matthew Carter to Bruce Lehnert, 26 March 1979. Unsorted, LGA, DTGC.

²⁹⁹ ‘Non-Romans, Greek, cont’d.’, office document, 20 March 1979.

³⁰⁰ Costas Chryssochoides to Stempel, 14 July 1980. Unsorted, LGA, DTGC.

³⁰¹ Matthew Carter to René Kerfante, 28 July 1980. Unsorted, LGA, DTGC.

Baskerville Greek (Proof)	Α	Β	Γ	Δ	Ε	Ζ	Η	Θ	Ι	Κ	Λ	Μ
Baskerville Greek (Final)	Α	Β	Γ	Δ	Ε	Ζ	Η	Θ	Ι	Κ	Λ	Μ
Baskerville Latin	A	B	F	V	E	Z	H	O	I	K	V	M
Baskerville Greek (Proof)	Ν	Ξ	Ο	Π	Ρ	Σ	Τ	Υ	Φ	Χ	Ψ	Ω
Baskerville Greek (Final)	Ν	Ξ	Ο	Π	Ρ	Σ	Τ	Υ	Φ	Χ	Ψ	Ω
Baskerville Latin	N		O	I	P		T	Y	I	X	I	O

Table 6. The table shows the Baskerville Greek uppercase characters as seen on the trial proof (first and fourth rows), and in their final iteration (second and fifth rows). Their designs are compared against the uppercase characters of the Latin Baskerville (third and sixth rows).

Baskerville Greek (proof)	α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ
Baskerville Greek (Final)	α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ
Baskerville Latin	o		y	o			n		i	k	y	n
Baskerville Greek (proof)	ν	ξ	ο	π	ρ	σς	τ	υ	φ	χ	ψ	ω
Baskerville Greek (Final)	ν	ξ	ο	π	ρ	ςσ	τ	υ	φ	χ	ψ	ω
Baskerville Latin	v		o	i	o	ao	t	u		y	I	

Table 7. The table shows the Baskerville Greek lowercase characters (first and fourth rows) as seen on the trial proof, and in their final iteration (second and fifth rows). Their designs are compared against the lowercase characters of the Latin Baskerville (third and sixth rows).

therefore suggests that no action was taken in response to these comments. The typeface was already commercially available, and Parker would not have wanted to repeat the long-winded design process of Caledonia Greek (see 3.2), especially in response to such minor comments.

As with the rest of the typefaces discussed in this thesis, Baskerville Greek's uppercase closely corresponds with its Latin equivalent therefore a large degree of uniformity can be seen between them. Interesting points for discussion are concentrated around the design of the Greek lowercase. The Baskerville Greek lowercase has many design similarities with the lowercase of Century Schoolbook Greek. To begin with, they appear to share the same or at least very similar contrast between them. This is not true of their Latin counterparts; Baskerville has a high contrast between thick and thin strokes whereas Century Schoolbook has a much lower contrast thus appearing more black. Moreover, lowercase characters between the two Greek adaptations are so similar to the extent that they could almost be interchangeable. The most prominent examples include: eta (η), theta (θ), kappa (κ), lambda (λ), mu (μ), nu (ν) and pi (π) (tables 5, page 144, and 7). There are additional similarities: Baskerville Greek's gamma (γ), lambda (λ) and chi (χ) are based on 'y'; eta (η) and mu (μ) are based on 'n'; rho (ρ) is a combination of 'o' and 'p'; and beta (β) is based on 'p'. Additionally, Baskerville Greek suffers from the same issue as Century Schoolbook Greek: distinctive features of the Greek script have been eliminated in favour of a Latin upright style that includes prominent serifs. Similarly to Century Schoolbook Greek, this Latin influence in its design diminishes Baskerville Greek's readability. Furthermore, due to the similarity between their respective characters, almost identical contrast as well as the use of serifs, there seems to be few distinguishing features between the two typefaces when set side by side (figure 6.13, and tables 5, page 144, and 7). Prominent examples include beta (β), delta (δ), epsilon (ϵ), eta (η), theta (θ), mu (μ), pi (π), rho (ρ), psi (ψ) and omega (ω) (table 8, page 150).

There are some differentiations: Baskerville Greek's lowercase gamma (γ) bears a degree of similarity to the equivalent character of Linotype's Times Greek No. 2. Similarities between these two typefaces can also be seen in the designs of alpha (α) and zeta (ζ) (table 9, page 150w). Times Greek No. 2 is a modulated, cursive typeface with no serifs that was used widely in Greek printing. It is comparatively more fluid and therefore quite different from the upright style of Baskerville Greek. As with the Helvetica Greek, it is quite possible that Carter's brief was to not only stay as close to the original Latin as possible, but also to incorporate features from popular typefaces such as Times Greek — of which Linotype's Times Greek No. 2 was a close variant. The result is that the Baskerville Greek lowercase bears little resemblance to its Latin counterpart; whereas the Latin Baskerville has crisp serifs, curved strokes with tapered ends as well as great consistency in size and form, the Greek adaptation has not developed Baskerville's defining features in order to meet the design requirements of the Greek characters.

According to Carter, although both Century Schoolbook and Baskerville Greek were successful in the Greek printing market, they did not enjoy a long life. Over time, both were judged as 'too Latinised' by their intended users. On the other hand, the sans-serifed Helvetica and Optima Medium Greek, endured much longer. Carter thought retrospectively that this was because 'the sans serif form is very natural to Greek, but the Latin idea of

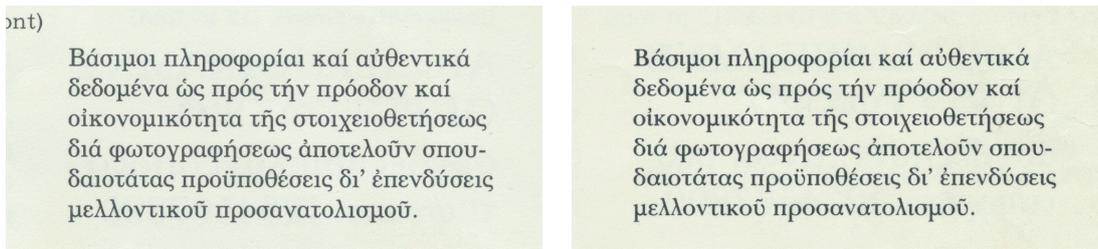


Figure 6.12. Text set in Century Schoolbook Greek (left) and Baskerville Greek (right). The similarities in the design of their characters and their contrast, as well as the profusion of serifs makes them comparable to each other. See also table below. From *Stempel Information Photocomp Type Faces* type specimen. 1980. LGA, DTGC. 75% of original size.

TABLE 8 Century Schoolbook Greek and Baskerville Greek lowercase										
Century Schoolbook Greek lowercase	β	δ	ε	η	θ	μ	π	ρ	ψ	ω
Baskerville Greek lowercase	β	δ	ε	η	θ	μ	π	ρ	ψ	ω

Table 8. Selected characters from Century Schoolbook Greek and Baskerville Greek. Examples of similarities in their design makes them comparable to each other.

TABLE 9 Baskerville Greek and Times Greek No. 2 lowercase			
Baskerville Greek lowercase	α	γ	ζ
Times Greek No. 2 lowercase	α	γ	ζ

Table 9. Selected characters from Baskerville Greek and Times Greek No. 2. The table shows some shared elements in their design. For example, the construction of the tail of the alpha (α), the angle of the loop of the gamma (γ), and the top horizontal curve and descender of the zeta (ζ).

sticking a serif on every possible place in the letterform is very un-Greek.³⁰² Indeed, extant sources demonstrate that Carter's sans serified Greeks are less idiosyncratic than the serified designs. Typefaces such as Century Schoolbook and Baskerville presented more of a challenge to adapt for Greek; they are part of a Latin calligraphic tradition that is quite different from Greek scribal practices. The task Carter had to fulfil was difficult as it meant that he had to make scripts with different design characteristics as well as cultural and historical traditions coexist harmoniously. The fact that he had to add Greek to existing and widely used Latin typeface families made his task more problematic; whether it was a brief requirement or not, the close adherence to the Latin models resulted in the new Greek typefaces looking formally unconventional, and at times unreadable. A more productive strategy might have been to ensure the legibility of the Greek characters and the overall readability of the Greek typefaces, as well as establishing a consistency of weight and contrast, rather than imposing the unique design features of the Latin typefaces onto the Greek.

6.6 Conclusion

After the design of Helvetica Greek, Linotype embarked on a programme of Greek type development that lasted approximately a decade, from 1972 to 1980, in order to help support the sales of photocomposition machines in Greece. In particular, the Variable Input Phototypesetter (V-I-P) was ideal for typesetting scripts, such as Greek, that employed accents, and Costas Chrysochoides was especially keen to promote it. In order to demonstrate Linotype's interest in the Greek printing market and its intention to supply it with quality typefaces, Mike Parker and Matthew Carter undertook a series of trips to Athens throughout the 1970s to meet with Chrysochoides and his clients, and to determine what kind of new Greek typefaces needed to be developed. Out of this process, decisions were taken to develop a number of typefaces, and the extant sources allow the study and discussion of the following: Optima Medium Greek, Cadmus, Century Schoolbook Greek and Baskerville Greek.

Due to the high degree of inherent similarity between the Latin and Greek capitals, there is generally a balance as well as a high degree of uniformity across the uppercase alphabets of all four Greek typefaces with their corresponding Latin ones. Interesting points of discussion occur with regards to the adaptation of the Greek lowercase from the Latin. Of the four typefaces examined in this chapter, the Optima Medium Greek lowercase is the one most closely related to its Latin counterpart. However, there are noticeable inconsistencies between them regarding the amount of contrast and weight; the Latin Optima Medium has lower contrast and appears darker whilst Optima Medium Greek has a comparatively higher contrast and appears lighter. The design of the serified Century Schoolbook and Baskerville Greek lowercases is more problematic. In both typefaces, distinctive features of the Greek script have been eliminated in favour of a Latin upright style including prominent serifs. This Latin influence reduces their readability. Moreover, due to the similarity of many characters of Century Schoolbook and Baskerville Greek, almost identical contrast as well as the use of serifs, there seems to be few distinguishing features between the two typefaces when set side-by-side.

³⁰² Re, 41.

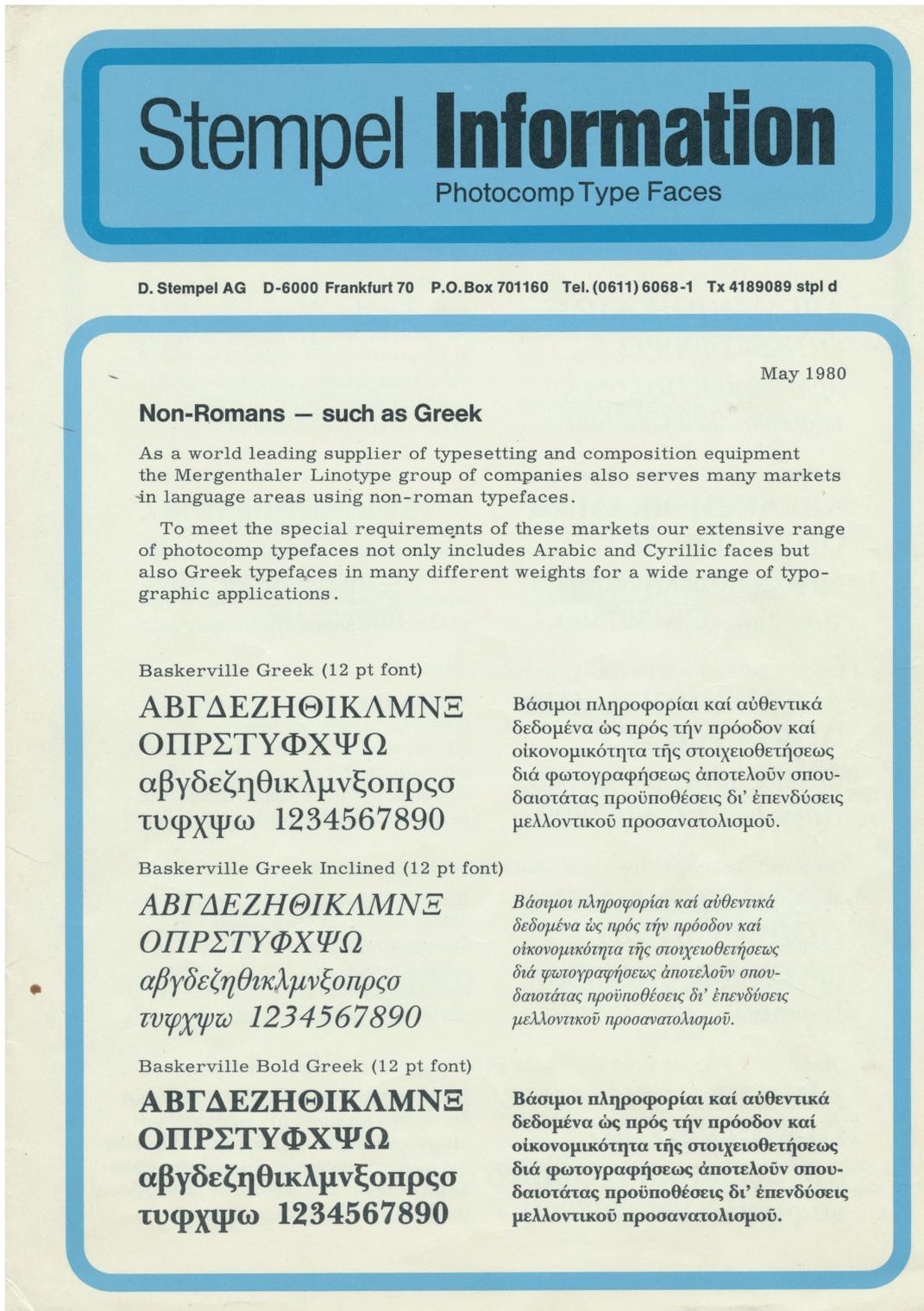


Figure 6.13. The final iteration of Baskerville Greek on the cover of *Stempel Information Photocomp Type Faces* type specimen. 1980. LGA, DTGC. 68% of original size.

The harmonious typographic coexistence of scripts with different design characteristics and from different historical and cultural contexts was a challenging task, and the extant archival material demonstrates that Carter may have adhered too closely to the parameters of the Latin typefaces he adapted. As a result, the Greek serifs are idiosyncratic, formally unconventional and at times unreadable. A bigger emphasis on the legibility of the Greek characters and the readability of the Greek typefaces as well as the consistency of weight and contrast may have yielded better results and contributed to a longer life for these typefaces.

Finally, Cadmus is different in that it was a typeface not borne out of commercial considerations. Instead, it was a project initiated by Carter himself in an effort to produce an original Greek typeface free of Latin influence. His research led him to historically earlier models of the Greek script, such as those found on inscriptions. Despite Carter's good intentions, Cadmus ultimately failed to sell in the Greek printing market due to its obvious historical influences and 'archaic' look at a time when the political and social climate was progressive, and the expansion of offset litho printing and photocomposition was encouraged. Therefore the quest for modern, western-influenced typographic standards was better encapsulated by a typeface like Helvetica Greek rather than Cadmus, which represented the past.

7 Conclusion

This thesis has drawn on oral history as well as extensive and largely unexamined primary sources from different archives in order to:

- examine the reasons that prompted Linotype to embark on Greek type design between 1970 and 1980;
- discuss whether this design work constituted a programme and, if so, explain the ways it came about;
- discuss the role of the Athens Publishing Center in facilitating Linotype's efforts to enter the nascent photocomposition market in Greece;
- examine which typefaces were developed and why;
- investigate the design process of these typefaces.

The systematic examination and cross-referencing of a large number of archival documents has enabled the gradual assembly of a hitherto unexplored narrative, and has provided answers to the above research questions to a large extent. Interviews with people who were involved in the development of the typefaces included in this thesis or who have first-hand knowledge of the Greek printing market, and the structure of the Doxiadis Organization have also provided valuable information towards addressing the research questions above. The sections that follow below encapsulate the key outcomes of this research, and how these relate to the research questions outlined above.

What were the reasons that prompted Linotype to embark on Greek type design between 1970 and 1980? Did this design work constitute a programme and, if so, how did this come about?

The use of photocomposition became viable after 1945. The technology was expensive, and initially limited to larger newspapers and printing businesses. The launch of Compugraphic Corporation's low-cost phototypesetters in the late 1960s were decisive in making photocomposition commercially popular with smaller printers and typesetting businesses. During that time, Linotype invested a substantial amount of research and development in order to produce competitive phototypesetters, aimed to expand the company's market for its machines, which had traditionally been newspaper publishing, into advertising as well as general jobbing printing.

Alongside the development of new phototypesetters, the company began a long-term, multi-faceted and ambitious programme of typeface development in order to support their sales in these new markets. The programme encompassed both Latin and non-Latin typefaces, including Greek. From 1963 until 1981, Mike Parker, Director of Typographic Development at the Mergenthaler Linotype Company in the U.S., presided over the expansion of the Linotype type library; typefaces were re-drawn, typeface families were expanded and new ones were commissioned from type designers such as Matthew Carter, Adrian Frutiger and Hermann Zapf to create an inclusive collection of designs for full page setting that suited the conditions imposed by phototypesetting and offset lithographic printing. Therefore, the programme of Greek type design was part of

Linotype's international market expansion, in this instance to enter the nascent Greek photocomposition market in the early 1970s.

What was the role of the Athens Publishing Center in facilitating Linotype's efforts to enter the nascent photocomposition market?

The Athens Publishing Center (APC) was the printing arm of the Doxiadis Organization (DO), which encompassed a number of affiliated companies under the direction of the urban planner Constantinos Doxiadis. Although APC was founded in order to accommodate the large volume of printing generated at DO, it also functioned as an independent printing business and as such had a number of prestigious clients which reflected the quality of the work it produced: the Greek National Gallery, other art galleries and cultural institutions, governing authorities, book publishers, pharmaceutical companies and private clients. APC was a forward-thinking company due to Doxiadis's interest in typography and his understanding of the value of design for the production of documents. To that effect, he brought typesetting in-house through the installation of the Linofilm Super-Quick phototypesetter. This installation subsequently enabled him to put in place a design strategy for the production of DO publications. Furthermore, the commission for the design of a new sans serif style Greek typeface, which as the brief developed turned into Helvetica Greek, made possible the alignment of DO's publications with mainstream typographic modernity at the time. These two events — the Linofilm Super-Quick installation and the design of Helvetica Greek — allowed Linotype to have its first phototypesetting installation in Greece and to establish a relationship with a reputable Greek printing company that had a prestigious clientele. APC could offer a filmsetting service at a time when few Greek printing companies were able to afford the transition from hot-metal to photocomposition. Having Helvetica Greek, then closely associated with typographic modernity, on the Linofilm Super-Quick was significant both for promoting APC's filmsetting service as well as promoting Linotype phototypesetting more widely in the Greek printing market. In less than a year after the installation of the Linofilm Super-Quick at APC, Linotype received an order for a Linotron 505, a bigger and more powerful phototypesetter than the Linofilm Super-Quick, from the Greek printer E. Valasakis and his company Fotron S.A. Graphic Arts. Valasakis benefited from the type design activity generated between APC and Linotype; not only his Linotron 505 was equipped with both Caledonia and Helvetica Greek, amongst other typefaces, but Valasakis himself expressed interest in Optima Medium Greek which Linotype began developing after the completion of Helvetica Greek.

What typefaces were developed and why?

The typefaces examined in this thesis are Caledonia Greek, Helvetica Greek, Optima Medium Greek, Cadmus, Century Schoolbook Greek and Baskerville Greek. They were part of a programme of Greek type development aimed to support sales of specific phototypesetters in the Greek printing market; the Linofilm Super-Quick, the Linotrons 505 and 303, the V-I-P, and the more affordable Linocomp. These new Greek type designs were principally adaptations — except for Cadmus — from successful Latin typefaces from the Linotype type library. Given the small size of the Greek printing market and the insufficient demand for Greek typefaces outside Greece, adapting popular and widely used Latin typefaces for Greek was a more cost effective and expedient process for Linotype. The only original type design

was Cadmus, which was Carter's effort to produce a Greek typeface that was free of Latin influence.

Caledonia Greek predates the other typefaces examined in this thesis. It was a typeface aimed at the Greek hot-metal newspaper market, and intended to address the lack of quality and variety of Greek typefaces in the field of hot-metal newspaper text composition, Linotype's traditional strength. Moreover, it was hoped that it would offer a sales advantage over Intertype, its main competitor in the Greek printing market. Caledonia Greek's development was initiated just before Linotype began focussing on the development of phototypesetters in order to expand to new printing markets as well as an ambitious programme of type development, both Latin and non-Latin, to support their sales. Therefore, the design of Caledonia Greek happened when Linotype's single focus on selling the majority of its machines and matrices in the newspaper market was coming to an end. On the other hand, Helvetica Greek's development was at the beginning of Linotype's phototypesetting expansion into new printing markets. Commissioned by Constantinos Doxiadis and the Athens Publishing Center in order to align DO publications with the typographic modernity of the time, Helvetica Greek was a versatile typeface which was used for text and display purposes. There is an absence of archival sources providing information on the briefs that informed the remaining typefaces — Optima Medium Greek, Century Schoolbook Greek and Baskerville Greek. Although the bilingual typesetting of books and other documents was a key consideration for their design, Optima Medium Greek and Century Schoolbook Greek were also suitable for display uses in advertising and magazine work. Baskerville Greek is the only design based on a Latin typeface for book setting. However, it could easily have been used for the setting of magazines as well. Overall, the design of these typefaces were aimed at enlarging Linotype's market in Greece.

What was the design process?

The amount of information on the design process of the typefaces examined in this thesis that archival sources have provided is variable; there is more information regarding the making of Caledonia and Helvetica Greek than the rest of the typefaces. However, they all, except for Cadmus, have some elements in common: they are faithful to the Latin model from which they originate. It is possible that this adherence was a by-product of the brief — in other words, it was a core requirement the type designer Matthew Carter had to fulfil based on clients' desires and feedback. Therefore Carter had the difficult task of making scripts with different design characteristics, and cultural and historical traditions coexist harmoniously. From the examination of extant character and text setting proofs, it becomes evident that in the effort to create 'companion' Greek typefaces to the original Latins, the unique design features of the Latin are imposed on the Greek. The results were Greek typefaces that looked formally unconventional and often unreadable, although it can be argued that the sans serifs Helvetica Greek and Optima Medium Greek are easier to read than the rest mainly due to their lack of serifs.

There is no evidence from archival sources that Linotype extensively used external expertise regarding any aspects of the Greek script. Instead the company appears to have relied only on its own in-house resources for the design and manufacture of these Greek typefaces. In the instances where the company obtained outside input, the results were mixed; the work of the Linotype representative Costas Chrysochoides and the designer

Grigoris Asteriades delayed the completion of Caledonia Greek greatly. Although experienced indigenous designers such as Sophia Zarabouka were consulted for the design of Helvetica Greek, it is impossible to ascertain the extent of her contribution or whether her feedback was implemented given that she does not remember anything about this particular project. There is no archival evidence that any expertise was sought for the remaining typefaces where Carter, after his experience with Helvetica Greek, appears to work fairly confidently with the assistance of the British type designer Tim Holloway.

7.1 Contribution to knowledge

This thesis contributes new information regarding previously unexamined aspects of Greek typography. Its subject is specific in that it focusses on a small number of Greek typefaces for photocomposition, and its findings are based on original research conducted using previously untapped archival material — including business correspondence, relevant company records and trial text and character setting proofs — and oral history. Although there are gaps in the narrative, the use of all these primary sources allows the construction of a reliable picture that sheds light on Linotype's presence in Greece, and its contribution to the variety and availability of Greek typefaces in the Greek printing market in the latter half of the twentieth century. The research makes use of the interviews conducted and Linotype's business correspondence across different archives in order to illuminate the process of making type; examining the decisions that were taken, determining individual contributions, and highlighting the role of collaboration and combined expertise that goes into the manufacture of typefaces with all the challenges it entails. Finally, a significant discovery in the course of this research has been the role that the urban planner Constantinos Doxiadis played in the introduction of the first installation of Linotype photocomposition technology in Greece, and in commissioning the design of Helvetica Greek. Doxiadis's engagement with printing and publishing is, as far as it can be discerned, little-known and undocumented compared to other, more prominent, aspects of his professional life.

7.2 Further research

It is hoped that this thesis will facilitate further research on the design of Greek typefaces, the introduction of photocomposition, and its impact on Greek typographic and printing practices in the late twentieth century. More specifically, issues that could not be covered in this thesis, but merit further investigation include uncovering more details on Linotype's Greek clientele, and examining the transition from hot-metal composition to phototypesetting in the Greek national press. Furthermore, this research provides a sound basis upon which to undertake further research in examining the precise work of the Athens Publishing Center, and to explore whether further links between Doxiadis and the Greek printing trade can be uncovered.

Appendix A Typographic features of the Greek script

This appendix provides a short survey of the typographic features of the Greek script in order to facilitate an understanding of its inherent particularities, and to support the evaluation of the typefaces included in chapters 3, 5 and 6.

Greeks customarily employed linear capital writing in inscriptions on stone monuments and clay objects. From the third century BC, there were also quicker and simpler ways of writing common things by using a more flowing or cursive script.¹ The gradual shift from uppercase to lowercase was primarily driven by the scribes' need for faster forms of writing, which in turn had a major impact on the shape of Greek letterforms. From the beginning of the ninth century AD, lowercase writing started replacing uppercase in codices and secular documents as it was quicker to write and it saved space on parchments. Moreover, it was easier to read since diacritics (see section 2 below) and word separation were also introduced during that time.² Scribal traditions not only influenced the shape of Greek letterforms, but also informed the design of Greek hot metal types used in the printing of books from the fifteenth century onwards. Of these, the printing types of Aldus Manutius have had the biggest impact; the numerous ligatures, abbreviations and diacritics they contained held back typographic creativity for some time to come. Pivotal developments in Greek type design were the printing types of Giambattista Bodoni and those of the Didot family in the nineteenth century; the typographic models they presented helped shape modern Greek typography into the twentieth century.³

Regarding typographic structure, both Greek and Latin uppercase alphabets share many common characters, and both have almost the same features; their letterforms employ vertical, horizontal and diagonal strokes of varying widths, with stems ending in terminals. Although Latin upper- and lowercase are typographically consistent as sets, the Greek lowercase is radically different to its uppercase; it is primarily cursive as the strokes of successive characters are joined and the angles are rounded. Fewer of its characters correspond to the equivalent uppercase ones.⁴ Therefore, in comparison to the Latin lowercase, Greek has a greater variety and irregularity of shapes. Moreover, it employs a number of diacritics vital to the correct setting of text — a feature the Latin script does not have. According to the type designer Takis Katsoulidis, the repetition of round shapes, such

1 Fischer, Steven Roger, *A History of Writing*, (The Netherlands: Reaktion Books Ltd., 2005), 129.

2 Kopidakis, M. Z., *Ιστορία της Ελληνικής Γλώσσας [History of the Greek language]*, (Athens: The Hellenic Literary and Historic Archive, 1999), 370-371. Diacritics were used to remind the reader of the musical intonation of the Greek language. However, the spread of lowercase writing enabled an emphasis to a more dynamic intonation, and accented syllables were no longer spoken at a higher pitch than non-accented ones. See also *Η Ελληνική Γραφή [The Greek Writing]*, (Athens: Hellenic Ministry of Culture and Sports, Directorate of Byzantine and Post-Byzantine Antiquities, National Epigraphical Museum, 2002), 82-85.

3 Katsoulidis, Takis, 'Η φυσιognωμία του Ελληνικού τυπογραφικού γράμματος' ['The physiognomy of the Greek typographic letter'], in *Greek Letters: From Tablets to Pixels*, ed. by M. S. Macrakis, (Delaware: Oak Knoll Press, 1996), 175-177.

4 Katsoulidis, Takis, *Το σχέδιο του γράμματος. Η Ελληνική γραφή. [The design of the letter. The Greek script]*, (Athens: Ekdotiki Ellados A.E., 2000), 27.

those of alpha (α) and omicron (ο), in the Greek lowercase creates a monotony of colour and texture on the printed page. In contrast, the typographic features of the Latin lowercase are more ‘architectural’, therefore less repetitive, and provide more of a harmonious contrast when printed.⁵ What follows below is a brief description of the Greek letterforms, including the use of diacritics and alternative letterforms.

1. Greek letterforms

The Greek alphabet consists of 24 letters. As already mentioned, many uppercase characters are the same as the Latin ones. More specifically, 14 of the Greek letters (Α, Β, Ε, Ζ, Η, Ι, Κ, Μ, Ν, Ο, Ρ, Τ, Χ) are the same whereas 11 have shapes not seen in Latin uppercase characters (Γ, Δ, Θ, Λ, Ξ, Π, Σ, Φ, Ψ, Ω and sometimes Υ). It is clear enough to ascertain the relationships between letterforms in the Greek and Latin uppercase alphabets, and type styles tend to be similar, if not exactly the same.⁶ In the lowercase alphabet, Greek letterforms diverge significantly from the Latin ones. Apart from the unfamiliarity of many of its characters to non-Greek speakers, Greek lowercase can generally be described as less upright and more rounded than the Latin.⁷ Additionally, the counters of its letterforms come in a variety of shapes and sizes, whilst far fewer of its terminals are at a right angle to the baseline and the vertical.⁸

The shape that occurs most frequently in Greek letterforms is the round counter, and it informs the design of most vowels (α, ο, υ, ω, ε) and consonants (δ, ρ, σ, θ, β, φ, ς). Other groupings with closely linked shapes are:

- ι, η, μ
- γ, ν, χ, λ
- ζ and ξ
- π and τ

Lowercase kappa (κ) and psi (ψ) are stand-alones as they do not particularly fit in any of the groupings shown above.

2. Diacritics

Modern Greek makes use of diacritics in order to aid pronunciation. This form of orthography employs a number of different diacritics, and is referred to as the polytonic system. It was abolished by presidential decree in 1982, and was replaced by a single accent form of orthography called the monotonic system.⁹ When Linotype was working on the Greek type development programme, Greek typefaces required a full polytonic complement, comprising three accents (acute, grave and circumflex), two breathings (rough and smooth), a mark to disambiguate diphthongs (diaeresis) and a mark to clarify long vowels (iota subscript).

⁵ Ibid., 27-28.

⁶ Bowman, John H., *Greek printing types in Britain from the late eighteenth to the early twentieth century*, (Thessaloniki: Typophilia, 1998), 27.

⁷ Ibid., 11.

⁸ Berry, John D., ‘A Collaborative Project: Aesthetics Meets Technology’, ed. by John D. Berry, *Now read this. The Microsoft ClearType font collection*, (USA: Microsoft ClearType and Advanced Technologies Group, 2004), 22.

⁹ Kopidakis, 324-325. Today the polytonic system is still used for the type setting of Ancient Greek texts. In practice, a number of Greeks, including literary writers, publishers, journalists and others, have continued to use the polytonic system of writing to this day. See also Mackridge, Peter, *Language and National Identity in Greece, 1766-1976*, (Oxford: OUP, 2010), 323.

Breathings can occur in combination with any of the accents and the iota subscript. The total number of combinations required, in addition to the twenty-four character set, in the design of a Greek typeface is a considerable task for the type designer and the major consideration for the typesetting system.

3. *Alternative letterforms*

In the Greek alphabet several single letters (β , θ , ξ , π , σ , τ and ϕ) have variant forms. Sigma has two forms, (σ) and (ς), with (ς) being used only in word endings and therefore known as final sigma, and (σ) in any other position. The alternative forms of beta (β), theta (θ) and phi (ϕ) are also still to be seen in modern Greek typefaces, although they occur instead of the other form, not in addition to it.¹⁰

¹⁰ Bowman, 20.

Appendix B Biographical information on key people

Nicholas Avronidakis joined Doxiadis Associates (DA) in 1961 as Constantinos Doxiadis's Personal Assistant (see biographical information below). Prior to that, he had studied in the U.S. where he obtained graduate and postgraduate degrees in Liberal Arts and International Relations. In 1964, Avronidakis was appointed DA's Head of Public Relations, becoming responsible for the company's general PR whilst at the same time he oversaw the production of its many publications. From 1966 he was also the Managing Director of the Athens Publishing Center. Avronidakis worked closely with Doxiadis in order to establish APC as a highly competitive printing business; he visited printing trade fairs in Greece as well as abroad frequently, and was involved in the purchase of all printing equipment including that of the Linofilm Super-Quick phototypesetter in 1970 (see chapter 4). He was subsequently responsible, alongside Doxiadis, for commissioning the design of Helvetica Greek by Linotype (see chapter 5). After his death in 1975, Doxiadis's numerous businesses gradually ceased to operate, and Avronidakis left following the closure of APC in 1978.

Matthew Carter (b. 1937) worked as a type designer for Linotype from 1965 to 1981. Prior to joining Linotype, he had a varied learning period starting with a year-long spell as an apprentice punchcutter at the Enschedé type foundry in Haarlem, Holland. Subsequently, he was employed as a typographic advisor at Crosfield Electronics, the British distributors of the Photon phototypesetter.¹ In 1965, at the invitation of Mike Parker (see biographical information below), Carter left Crosfield Electronics in the U.K. to work for the Mergenthaler Linotype Company in the U.S. He worked independently, away from Mergenthaler's letterdrawing office, and had a great deal of autonomy on his own projects. Although he met with clients when necessary, Carter primarily focussed on type design. He returned to London in 1971 in order to set up as an independent type designer, however he continued working exclusively for Linotype until 1981. From 1965 until 1981, he designed a large number of typefaces for different scripts as well as different uses, including all the Greek typefaces examined in chapters 5 and 6 of this thesis.

Costas Chrysochoides was Linotype's, as well as Nebiolo's, sales representative in Greece. His role was, amongst other things, to promote Linotype equipment and develop a strong sales network for them. His in-depth knowledge of the Greek printing industry was crucial for Linotype's development of Caledonia Greek (see chapter 3) and for entering the nascent Greek photocomposition market (see chapter 6). Additionally, Chrysochoides acted as an intermediary between Linotype and its Greek clients, by arranging face-to-face meetings. These enabled Linotype to increase its understanding of the Greek market's printing requirements and, as a result, led to a programme of Greek type development specifically for photocomposition.

¹ Hoffman, Phyllis R., *Matthew Carter Reflects on Type Design*. Unpublished MSc dissertation, School of Printing Management & Science, College of Imaging Arts and Sciences, Rochester Institute of Technology (RIT), Rochester, New York, 1999, 7-8.

Constantinos Doxiadis (1913-75) was an urban planner of international standing, and a major exponent of modernist architecture in Greece who gained global prominence in the 1950s and 1960s. The work of his consultancy Doxiadis Associates (DA) is associated with the postwar period, which fostered a climate of international cooperation as well as faith in the ability of science and technology to stimulate progress. It encompassed the development of new villages, towns and cities, and included agriculture and irrigation projects, extensive public works, centres of commerce and tourism, as well as the planning of urban housing and regeneration. During the postwar period, the role of the United Nations and the World Bank became increasingly central in the financial and social regeneration of many countries, and Doxiadis's work was closely linked with the initiatives of both these institutions. His specialist field was the drawing up of practical housing programmes for developing countries that aimed to improve the lives of millions of people. Through the United Nations' Technical Assistance Programme, he developed national building schemes for countries such as Iraq, Syria, and Jordan. He also implemented large housing projects in the U.S. during the Lyndon Johnson administration, and was responsible for the design of the capital of Pakistan, Islamabad.² Doxiadis also founded the Athens Publishing Center (APC), the printing company which facilitated Linotype's entry into the nascent photocomposition market in Greece (see chapter 4), and commissioned the design of Helvetica Greek (see chapter 5).

Mike Parker (1929-2014) originally trained as an architect at Yale University in 1951. He then completed an MFA from the Graphics Arts School of Design in 1956, also at Yale. Parker was exposed to typographic history during a two-year period he spent cataloguing artefacts at the Plantin-Moretus Museum archives in Antwerp, Belgium.³ He subsequently returned to the U.S. and started working for the Mergenthaler Linotype Company as Jackson Burke's assistant before succeeding him as Director of Typographic Development in 1963.⁴ As part of his role, Parker successfully oversaw and completed the conversion of Linotype's typefaces from hot metal to photocomposition — a process that had begun while Jackson Burke was director — and more than 1,000 typefaces were added to the Linotype type library (see 3.1).⁵

Walter Tracy (1914-95) started his professional life as a compositor in London. He joined Linotype & Machinery (L&M) in 1947 as Manager of Typeface Development.⁶ In this role, Tracy was involved in the planning and development of new and existing typefaces for Linotype, and liaised with senior management, sales personnel and Linotype representatives regarding sales of Linotype equipment and typefaces. He worked closely with the head of the letterdrawing office at L&M's factory in Altrincham developing new typefaces, expanding the existing range with new variations and combinations, and commissioning

² Kirtsis, A. A., 'Εισαγωγικό σημείωμα' ['Introductory note'], in *Κωνσταντίνος Α. Δοξιάδης, Κείμενα, σχέδια, οικισμοί* [Constantinos A. Doxiadis. *Texts, designs, settlements*], ed. by A. A. Kirtsis, (Athens: Ikaros, 2006), 10.

³ The Plantin Moretus Museum was the former residence and printing establishment of the Renaissance humanist book printer and publisher Christophe Plantin (1520-1589). The Museum's collections pertain to printing history, including artefacts such as printing plates, presses, dies, type cases, moulds, punches, matrices, etc.

⁴ Romano, Frank, *History of the Linotype Company*, (Rochester: RIT Press, 2014), 192.

⁵ *Ibid.*, 326.

⁶ Hutt, Allen, 'Walter Tracy, Type Designer', in *Penrose Annual*, vol. 66, ed. by Herbert Spencer, (London: Lund Humphries Publishers Limited, 1973), 101.

new designs from independent type designers. Tracy specialised in typefaces for news text, both for the editorial body and for classified text. Many of his typefaces were used widely by newspapers, and some of the most notable ones are Jubilee (1953), Adsans (1959), Maximus (1967), Telegraph Modern (1969), commissioned by *The Daily Telegraph*, and Times Europa (1972), commissioned for *The Times*. From the 1950s onwards, Tracy also developed a number of typefaces for Arabic, Hebrew and Indic scripts.⁷ Tracy's career at Linotype was distinguished, and in 1973 he was made Royal Designer for Industry.⁸

Sophia Zarabouka was responsible for the design of corporate materials of the Doxiadis Organization (DO). She studied graphic design at the Doxiadis School, and later at Howard and Washington Universities in Washington D.C. from 1961 to 1963 through a scholarship programme available to Doxiadis Associates (DA) employees. She also attended the prestigious 'Publishing Procedures' course at Radcliffe College in Cambridge, Massachusetts — a unique six-week summer training course in book and magazine publishing which prepares graduate students for jobs in the publishing field. At the time of her attendance, the study of printing technology, such as photocomposition, for the production of books, magazines and newspapers was an integral part of the course. Whilst still working for DO, she began taking on freelance design work. Since 1974, she has concentrated on writing and illustrating books for children.⁹

7 Tracy, Walter, 'Composing Room Days (and After)', *Printing Historical Society*, Bulletin 40, Winter 1995-96, 12-13.

8 'Obituary: Walter Tracy', *The Independent*, Monday 1 May 1995. < <http://www.independent.co.uk/news/people/obituary-walter-tracy-1617836.html> > [accessed 13 February 2013].

9 Zarabouka, Sophia, personal interview, Athens, Greece, 27 May 2017.

Appendix C The development of the Ekistics theory

Doxiadis claimed that Ekistics was born when, returning to Athens from the front in 1941, he witnessed the extent of the devastation the Second World War had caused in the towns and villages along the way.¹ Since the late 1940s, he had been trying to find a systematic approach for the arrangement and diagrammatic representation of data which would lead him to an objective and holistic urban design.² He believed deeply that science and technology could provide appropriate solutions for the alleviation of social problems, and that in order to create the cities of the future a process of working methodically needed to be developed.³ In his article entitled *Ekistics. The Science of Human Settlements*, Doxiadis wrote:

There is a need for a science dealing with human settlements, because otherwise we cannot view these settlements in a reasonable way. Is such a science possible? The answer can be given in two ways. First, by observing that, in some periods in the past, people must have had such a science, which was probably written down only in ancient Greek times (in documents by the architect and engineer Vitruvius). Otherwise, how did people create cities that we still admire? Second, we are now convinced that man, in creating his settlements, obeys general principles and laws whose validity can be demonstrated. These principles and laws are actually an extension of man's biological characteristics, and in this respect we are dealing with a biology of larger systems.⁴

Doxiadis coined the term 'Ekistics' in order to describe what he called 'the science of human settlements'.⁵ In Ekistics, cities, their histories and economies, as well as their populations with their respective behaviours became the subject of scientific study.⁶ For Doxiadis, creativity in architecture and urban planning stemmed from the implementation of the scientific logic of other disciplines, such as sociology, anthropology, geography, psychology, politics and aesthetics, allowing for a richer and more refined methodology to provide solutions to complicated urban problems.⁷ Tsiambaos states that 'Ekistics was based on a schematic organisation, an information mapping of the various relations between the human being and its natural and cultural environment in every possible scale'.⁸

Ekistics involved the descriptive study of all kinds of human settlements — including regional, city and community planning as well as dwelling design — and the formulation of general conclusions aimed at achieving harmony between the inhabitants of a settlement

1 Kirtsis, A. A., *Κωνσταντίνος Α. Δοξιάδης. Κείμενα, σχέδια, οικισμοί* [Constantinos A. Doxiadis. Texts, designs, settlements], ed. by A. A. Kirtsis, (Athens: Ikaros, 2006), 342.

2 Tsiambaos, Kostas, 'Isotype diagrams from Neurath to Doxiadis', *Architectural Research Quarterly*, 16.1, (2012), 54.

3 Kirtsis, 449.

4 Doxiadis, Constantinos, 'Ekistics. The Science of Human Settlements'. <http://www.doxiadis.org/Downloads/ecistics_the_science_of_human_settlements.pdf> [accessed 22 November 2015].

5 The word 'ekistic' itself derives from the Greek adjective 'οικιστικός' (oikistikos). More specifically, from the neutral plural 'οικιστικά' (oikistika) meaning those elements concerning the foundation of a house, a habitation, a city or colony, or contributing to the settling. See Ekistics. The science of human settlements (definition) (2013). <<http://www.ekistics.org/>> [accessed 31 July 2013].

6 Tsiambaos, 'Isotype Diagrams', 54.

7 Ibid., 53.

8 Ibid.

and the physical and sociocultural environments. Doxiadis himself was convinced that:

We cannot acquire proper knowledge about our villages, towns and cities unless we manage to see the whole range of the man-made systems within which we live, from the most primitive to the most developed ones — that is, the whole range of human settlements. This is as necessary as an understanding of animals in general is to an understanding of mammals — perhaps even more so. Our subject, the whole range of human settlements, is a very complex system of five elements — nature, man, society, shells (that is, buildings), and networks. It is a system of natural, social, and man-made elements which can be seen in many ways — economic, social, political, technological, and cultural. For this reason only the widest possible view can help us to understand it.⁹

Therefore the first steps in developing an Ekistics study were not a series of sketches or architectural drawings, but systematic data collection. An Ekistics study relied on statistics and descriptions organised in five ‘elements’:

- nature, such as geography, natural resources, climate, fauna and flora;
- human biological and emotional needs, sensations and perceptions, and moral values;
- society, including population characteristics, cultural patterns, economic development, education, health and welfare, social hierarchies, law and administration;
- shells, or structures, in which people live and function, such as schools and housing;
- networks that facilitate life and day-to-day functions, such as water and power systems, transportation, and communications. Ekistics drew on economics, the social sciences as well as a number of technical and cultural disciplines in order to formulate laws or theories that can be used by builders, planners, architects and engineers ‘to cure the maladies of existing settlements or prevent them in new ones’.¹⁰

Essentially, Doxiadis sought to humanise cities. Underlying Ekistics was the understanding that the interaction between people and their environment directly affected their individual and collective well-being. In collecting data from different disciplines, his aim was to build human settlements that balanced man’s relationship with the natural world and its resources. In his view, if human settlements were to expand efficiently and economically, urban planners had to reorganise the way in which villages, towns, cities and metropoli were formed, and by doing so, humans could begin to manifest their potential.¹¹

Doxiadis did much to promote Ekistics. In 1958, he founded the Athens Technological Association (ATO), a non-profit organisation consisting of two divisions: education and research. The education division encompassed what became known to the wider Greek public as the Doxiadis School (see chapter 2, page 27). From 1959 until their closure in

⁹ Doxiadis, Constantinos, ‘Ekistics. The Science of Human Settlements’. <http://www.doxiadis.org/Downloads/ecistics_the_science_of_human_settlements.pdf> [accessed 31 July 2013].

¹⁰ Ibid.

¹¹ Doxiadis, Constantinos, ‘Anthropocosmos. The World of Man’. <http://www.doxiadis.org/Downloads/Anthropocosmos.%20The%20World%20of%20Man%20_me%20ologo_.pdf> [accessed 21 November 2015].

1976, the school trained 25,000 students in, amongst other things, interior, graphic and architectural design, art conservation, engineering, as well as computer programming. It was the first educational institution of its kind in Greece, contributing greatly towards the Greek higher education sector at a time when there was no state provision for many of these disciplines.¹² The research division, renamed the Athens Center of Ekistics (ACE) in 1963, ran a successful and internationally recognised graduate programme on Ekistics as well as a number of research programmes on urban planning. Many of them focussed on the future of cities, as well as the promotion of the scientific development and dissemination of Ekistics. These programmes were sponsored by large funding bodies outside of Greece, such as the Ford and Rockefeller Foundations in the U.S.¹³ Much of the research that was carried out was in tandem with the practical work produced by Doxiadis Associates (DA),¹⁴ re-enforcing a model whereby research was informed by practice and vice versa.

Doxiadis believed firmly in the unity of all sciences and actively promoted the dialogue across different disciplines. From 1962 until 1974 he organised, through the ACE, the Delos Symposia, named after the Greek island where they were partly held. These were annual ten-day fora for discussion and debate about contemporary urban issues, including the development of Ekistics as a science. The fora were primarily dominated by natural and social sciences academics, but they also included politicians, technocrats and technologists. At the end of every forum a declaration of outcomes was signed collectively and subsequently published. The fora found support amongst well-established scholars such as the historian Arnold J. Toynbee, the economist Barbara Ward, the inventor and systems theorist Buckminster Fuller, and the anthropologist Margaret Mead.¹⁵

Given his long-standing interest in printing and publishing, Doxiadis started producing the English-language journal *Ekistics* (see chapter 4). First published in October 1955 and produced to this day, it is a review of the problems and science of human settlements. It was initially conceived as a monthly bulletin of information that aimed to keep architects and planners in developing countries up-to-date with relevant professional expertise by reprinting articles from international journals. Over time, it evolved into a journal with mostly original articles, and its first editor was the British architect and urban planner Jaqueline Tyrwitt (1905-83), Professor of City Planning and Urban Architecture at Harvard University. The journal was sent to United Nations housing and planning experts working in developing countries, and attracted subscriptions from a number of universities and research centres worldwide.¹⁶ From 1959 onwards, Doxiadis produced a large volume of articles, books and publications relating to Ekistics. Some of the most important ones include *Between Dystopia and Utopia* (1966) and *Ekistics – An Introduction to the Science of Human Settlements* (1968).¹⁷

¹² Kirtsis, 427.

¹³ Ibid., 461.

¹⁴ Ibid., 449-452.

¹⁵ Ibid., 457.

¹⁶ Ekistics. The science of human settlements (definition) (2013), <<http://www.ekistics.org>> [accessed 31 July 2013]. See also Kirtsis, 461.

¹⁷ Kirtsis, 450.

Appendix D Selected correspondence

This appendix includes a selection of correspondence from the Constantinos A. Doxiadis Archive (Athens, Greece), the Mergenthaler Linotype Company Records (National Museum of American History, Washington D.C.), the Linotype Greek Archive and Walter Tracy's correspondence (both at the Department of Typography & Graphic Communication, University of Reading, UK). The letters and other office documents included here are some of the primary sources used in this research, and excerpts from them have been quoted in this thesis. The correspondence is arranged chronologically.

1. Jackson Burke to Walter Tracy, 'Re: Greek', 21 April 1961. File Greek Miscellaneous, Box Historical (3/3), NMAH. 95% of original size. 183
2. Walter Tracy to Mike Parker, 'Greek', 1 May 1964. File Caledonia Greek, Box 6, NMAH. 100% of original size. 185
3. Mike Parker to Costas Chrysochoides, 17 July 1964. File Caledonia Greek, Box 6, NMAH. 95% of original size. 187
4. Costas Chrysochoides to Mike Parker, 5 August 1964. File Caledonia Greek, Box 6, NMAH. 95% of original size. 189
5. Walter Tracy to Costas Chrysochoides, 'Caledonia Greek', 21 December 1964. File Caledonia Greek, Box 6, NMAH. 95% of original size. 191
6. Walter Tracy to Mike Parker, 'Caledonia Greek', 19 January 1966. File Caledonia Greek, Box 6, NMAH. 107% of original size. 195
7. Walter Tracy to John Parsons, internal memo, 'Caledonia Greek', 6 February 1968. File 20, Greek, WTC, DTGC. 75% of original size. 197
8. Walter Tracy to Costas Chrysochoides, 16 February 1968. File 20, Greek, WTC, DTGC. 70% of original size. 199
9. Doxiadis, Constantinos, internal memo, 'Ίδρυση μονάδας γραφικών τεχνών' ['Establishment of graphic arts unit'], 27 April 1966. "Signs by C.A. Doxiadis (SD-DC) Concerning Doxiadis Organization activities (1965-1971)", (Archive Files 19025), CADA. 70% of original size. 201
10. David Tyrwhitt-Drake to E.S. Emery and Walter Tracy, report, 'DJTD/JQ. Nicholas Avronidakis - Manager, Athens Publishing Center Graphic Arts Co. Ltd., 39, Demokritou Street, Athens 136', 20 October 1969, File 30, Photocomposition, WTC, DTGC. 80% of original size. 205
11. Albert Salt to David Tyrwhitt-Drake, 'Athens Publishing Center, Athens, Greece', 22 October, 1969. File 30, Photocomposition, WTC, DTGC. 70% of original size. 207
12. Mike Parker to Albert Salt, 'Athens Publishing Center, Athens - Greece', 18 December 1969. File 20, Greek, WTC, DTGC. 70% of original size. 209
13. Albert Salt to Mike Parker, 'Athens Publishing Center, Athens, Greece', 29 December 1969. File 20, Greek, WTC, DTGC. 70% of original size. 215
14. Mike Parker to Albert Salt, 'Athens Publishing Center, Athens, Greece', 26 January 1970. File 20, Greek, WTC, DTGC. 70% of original size. 223

15. Mike Parker to Albert Salt, 'Athens Publishing Centre, Athens, Greece',
6 February 1970. 70% of original size. File 20, Greek, WTC, DTGC. 227
16. Doxiadis, Constantinos, company memo, 'Σκέψεις πάνω στην τυποποίηση
των σελίδων μας' ['Thoughts on the standardisation of our pages'],
1 June 1970, 1-2. General Scientific Matters: Publications through Athens
Publishing Center, CADA. 70% of original size. 233
17. Mike Parker to Nicholas Avronidakis, 9 March 1971. File 20, Greek,
WTC, DTGC. 70% of original size. 241
18. Nicholas Avronidakis to Mike Parker, 17 July 1971. Unsorted, LGA, DTGC.
70% of original size. 249
19. Mike Parker to Matthew Carter, 29 June 1972. File Matthew Carter, Box 3,
NMAH. 95% of original size. 251
20. Walter Tracy to Matthew Carter, 'Optima Medium Greek', 4 July 1972.
File 20, Greek, WTC, DTGC. 70% of original size. 255
21. Matthew Carter to Mike Parker, 'Optima Medium Greek', memo, 10 August 1972.
Unsorted, LGA, DTGC. 67% of original size. 257
22. Mike Parker to Costas Makris, 23 July 1973. Label V-I-P Products, File V-I-P Greek
PF24-3/V-I-P/Products (Old)/Technical, Box 1, NMAH. 259
23. Costas Makris to Mike Parker, 21 September 1973. Label V-I-P Products, File V-I-P
Greek PF24-3/Products (Old)/Technical, Box 1, NMAH. 25% of original size. 263
24. Mike Parker to Costas Chrysochoides, 'Subject: Century Schoolbook Greek',
15 March 1976. File Foreign Miscellaneous, Box 3, NMAH. 95% of original size. 267
25. Costas Chrysochoides to Mike Parker, 'Century Schoolbook Greek', 9 June 1976.
Unsorted, LGA, DTGC. 67% of original size. 269
26. Matthew Carter to Tim Holloway, 'Baskerville Greek Upright', 26 January 1977.
Unsorted, LGA, DTGC. 70% of original size. 271
27. Matthew Carter to Lennie Battipaglia, 28 November 1978. Unsorted, LGA, DTGC.
70% of original size. 273
28. 'Non-Romans, Greek, cont'd.', office document, 20 March 1979. Unsorted,
LGA, DTGC. 68% of original size. 277
29. 'Plan for next Greek typefaces', office document, 21 March 1979. Unsorted,
LGA, DTGC. 70% of original size. 281
30. Matthew Carter to René Kerfante, 28 July 1980. Unsorted, LGA, DTGC.
70% of original size. 283

Bibliography

Published sources

- ANON., *Η Ελληνική γραφή [The Greek writing]*, (Athens: Hellenic Ministry of Culture and Sports, Directorate of Byzantine and Post-Byzantine Antiquities, National Epigraphical Museum, 2002), 82-85.
- ANON., *Fry's Printing Metals*, (London: Fry's Metal Foundries, 1966).
- ANON., *The International Type Book* (London: Studio Editions, 1992).
- ANON., 'Τάκης Κατσουλίδης. Ο Έλληνας χαράκτης που "χαράζει" ιστορία.' ['Takis Katsoulidis. The Greek engraver that "engraves" history'], *Ντιζάιν*, 1 (1991), 6-7.
- ANON., 'Η τυπογραφία κατά την τρέχουσα εβδομηκονταετία' ['Typography in the next seventy years'], *Η Τυπογραφία*, Issue 293-4, 1 January 1972, 12.
- BECKER, Lutz and Hollis, Richard, *Avant-Garde Graphics, 1918-1934*, (London: Hayward Gallery, 2004).
- BERMAN, Marshall, *All That is Solid Melts Into Air. The Experience of Modernity*, (London and Brooklyn: Verso, 2010).
- BERRY, John D., 'A Collaborative Project: Aesthetics Meets Technology', ed. by John D. Berry, *Now Read This. The Microsoft ClearType Font Collection*, (USA: Microsoft ClearType and Advanced Technologies Group, 2004), 15-23.
- BLACKWELL, Lewis, *Twentieth Century Type*, (London: Laurence King Publishing, 1992).
- BLUHM, Andrew, *Phototypesetting*, (London: Pergamon Press, 1968)
- BOAG, Andrew, 'Monotype and Phototypesetting', *Journal of Historical Printing Society*, 2 (2000), 57-77.
- and Burke, Christopher (eds), *History of the Monotype Corporation*, (London and Woodstock: Printing Historical Society and Vanbrugh Press, 2014)
- BOWMAN, John H., *Greek Printing Types in Britain from the Late Eighteenth to the Early Twentieth Century*, (Thessaloniki: Typophilia, 1998).
- BRINGHURST, Robert, *Στοιχεία της τυπογραφικής τέχνης [The Elements of Typographic Style]*, (Herakleion: Crete University Press, 2001).
- BURKE, Christopher, 'Isotype: Representing Social Facts Pictorially'. *Information Design Journal*, 173, (2009), 210-221.
- ; Kindel Eric and Walker, Sue, *Isotype. Design and Contexts, 1925-1971*. (London: Hyphen Press, 2013)
- CARTER, Matthew, 'Which Came First, the Greeks or the Romans?', in *Greek Letters: From Tablets to Pixels*, ed. by M.S. Macrakis, (Delaware: Oak Knoll Press, 1996), 197-210.
- , 'How typesetting technology affects typeface design', *Upper & Lowercase*, 4.3, (1977), 49-51.
- CARTER, Sebastian, *Twentieth Century Type Designers*, (New York and London: W. W. Norton & Company, 1995).
- CLAIR, Colin, *A History of European Printing*, (London and New York: Academic Press, 1976).
- , *A History of Printing in Britain*, (London: Cassel & Company Ltd., 1965).

- CLOGG, Richard, *A Concise History of Greece (2nd Edn)*, (Cambridge: Cambridge University Press, 2002).
- CONSTANTINIDIS, Fanis, 'Είμεθα δυσαρεστημένοι με τα στοιχειοχυτήρια' ['We are dissatisfied with the type foundries'], *Η Τυπογραφία*, Issue 143, 1 February 1965, 7.
- COOK, B.F., 'Introduction to Greek Inscriptions', in *Reading the Past. Ancient Writing from Cuneiform to the Alphabet*, (London: British Museum Press, 1998), 262-275.
- DAMIANOS, Nikos, 'Τα τυπογραφικά στοιχεία και οι βιοτέχνες τυπογράφοι' ['Metal types and jobbing printers'], *Η Τυπογραφία*, Issue 143, 1 February 1965, 7.
- DARNTON, Robert, 'Work and Culture in an Eighteenth-Century Printing Shop', *The Quarterly Journal of the Library of Congress*, 39.1, (1982), 34-47.
- DRIMIOTIS, Andreas, 'The contribution of C. A. Doxiadis in the development of the information technology in Greece', in *Ο Κωσταντίνος Δοξιάδης και το έργο του. Τόμος 1* [*Constantinos Doxiadis and his work. Volume 1*], ed. by Giota Kazazi, (Athens: Technical Chamber of Greece, 2009), 51.
- DODGSON, Mark and Gann, David, *Innovation. A Very Short Introduction*, (Oxford: Oxford University Press, 2010).
- DOXIADIS, Constantinos A., *Ekistics. An Introduction to the Science of Human Settlements*, (London: Hutchinson & Co. Ltd., 1968).
- EFSTATHIADIS, Giannis, 'Περίβλεπτοι Διόσκουροι μιας Τέχνης ταπεινής' ['Prominent Dioscuri of a humble Art'], in *Διαδρομές/Design Routes*, by Carabott Freddie; Katzourakis, Michalis and Katzouraki, Agni, (Athens: Hellenic Literary and Historic Archive, 2008).
- EVANS, Richard J., *In Defence of History*, (London: Granta, 1997).
- FILIPPIDIS, Dimitris, *Κωσταντίνος Α. Δοξιάδης (1913-1975). Αναφορά στον Ιππόδαμο*. [*Constantinos A. Doxiadis (1913-1975). Report to Hippodamus*], (Athens: Melissa, 2015)
- FISCHER, Steven Roger, *A History of Writing*, (The Netherlands: Reaktion Books Ltd., 2005).
- GALLANT, Thomas. W., *Brief Histories. Modern Greece*. (London: Arnold Publishers, 2001).
- GAY, Peter, *Modernism. The Lure of Heresy. From Baudelaire to Beckett and Beyond*, (London: Vintage Books, 2009).
- GIANNOPOULOS, ΡΥΓΓΟΣ, 'Τυπογραφία – Δημοσιογραφία' ['Typography – Journalism'], *Η Τυπογραφία*, Issue 57, 25 January 1961, 6.
- HARVEY, Christopher and Matthew, H.C.G., *Nineteenth-Century Britain. A Very Short Introduction*, (Oxford: Oxford University Press, 200).
- HEALEY, John F., 'Consolidation of the Alphabet and Export to the West', in *Reading the Past. Ancient Writing from Cuneiform to the Alphabet*, introduced by J. T. Hooker, (London: British Museum Press, 1998), 221-235.
- HEATH, L.G. and Faux, Ian, *Phototypesetting*, (Manchester: SITA LIMITED incorporating Lithographic Training Services Limited, 1983).
- HOBBSAWM, Eric, *Age of Extremes. The Short Twentieth Century. 1914-1991*, (London: Penguin, 1994).
———, *The Age of Revolution, 1789-1848*, (London: Abacus, 1977).
- HOFFMAN, Eduard, 'Helvetica – Some Thoughts on a New Typeface', in *Helvetica Forever. Story of a Typeface*, ed. by Victor Malsy and Lars Müller, (Baden: Lars Müller Publishers, 2009), 98-99.
- HOLLIS, Richard, *Swiss Graphic Design. The Origins and Growth of an International Style. 1920-1965*, (London: Laurence King Publishing, 2006).

- HUTT, Allen, *The Changing Newspaper. Typographic Trends in Britain and America. 1622-1972*. (London: Gordon Fraser, 1973).
- , ‘Walter Tracy, Type Designer’, in *Penrose Annual*, vol. 66, ed. by Herbert Spencer, (London: Lund Humphries Publishers Limited, 1973), 101-115.
- JASPER, W. Pincus; Berry, W. Turner and Johnson, A. F., *The Encyclopaedia of Typefaces*, (London: Blandford Press, 1970).
- JUDT, Tony, *Postwar. A History of Europe since 1945*, (London: William Heinemann, 2005).
- INCE, Catherine, ‘Spread the Word. Bauhaus Instruments of Communication’, in *Bauhaus. Art as Life*, (London: Koenig Books and Barbican Art Gallery, 2012), 112-115.
- KASDAGLIS, Emmanouil, *Σκαλαθύρματα [Skalathirmata]*, (Athens: MIET, 2004).
- KATSOULIDIS, Takis, *Το σχέδιο του γράμματος. Η Ελληνική γραφή [The design of the letter. The Greek script]*, (Third Edn), (Athens: Ekdotiki Ellados A.E., 2000).
- , ‘Η φυσιολογία του Ελληνικού τυπογραφικού γράμματος’ [‘The physiognomy of the Greek typographic letter’], in *Greek Letters: From Tablets to Pixels*, ed. by M.S. Macrakis, (Delaware: Oak Knoll Press, 1996), 175-184.
- KIEHEL, Constance, ‘Security of Job Tenure and Trade-Union Out-of-work Benefits, 1926-1929 and 1930-1933’, *The American Economic Review*, 27.3, (1937), 452-467.
- KINROSS, Robin, *Modern Typography. An Essay in Critical History*, (London: Hyphen Press, 2004).
- , *Unjustified Texts. Perspectives on Typography*, (London: Hyphen Press, 2011).
- KIRTSIS, A. A., ‘Εισαγωγικό σημείωμα’ [‘Introductory note’], in *Κωνσταντίνος Α. Δοξιάδης. Κείμενα, σχέδια, οικισμοί [Constantinos A. Doxiadis. Texts, designs, settlements]*, ed. by A. A. Kirtsis, (Athens: Ikaros, 2006), 9-33.
- KOLIOPOULOS, John S., and Veremis, Thanos M., *Greece: The Modern Sequel. From 1821 to the Present*, (London: C. Hurst & Co. Ltd., 2002).
- KOPIDAKIS, M.Z., *Ιστορία της Ελληνικής γλώσσας [History of the Greek Language]*, (Athens: The Hellenic Literary and Historical Archive, 1999).
- KOURVETARIS, Yorgos A. and Dobratz, Betty A., *A Profile of Modern Greece. In Search of Identity*, (Oxford: Clarendon Press, 1987).
- LANGER, Axel, ‘An Impersonal Typeface for Today and Tomorrow’, in *Helvetica Forever. Story of a Typeface*, ed. by Victor Malsy and Lars Müller, (Baden: Lars Müller Publishers, 2009), 19-67.
- LAWSON, Alexander, *Anatomy of a Typeface*, (Boston: David R. Godine, 1990).
- LEANDROS, Nikos, *Μαζικά έντυπα επικοινωνίας στην Ελλάδα. Οικονομικές και τεχνολογικές προσεγγίσεις [Mass communication publications in Greece. Financial and technological approaches]*, (Athens: Delfini, 1992).
- LEONIDAS, Gerry, ‘A Primer on Greek Type Design’, in *Language, Culture, Type. International Type Design in the Age of Unicode*, ed. by John D. Berry (New York: ATypI Graphis, 2002), 76-90.
- LETRASET, *Letraset catalogue*, (London: Letraset UK Limited, 1981).
- LEWIS, John, *Anatomy of Printing*, (London: Faber and Faber Limited, 1970).
- LOUKOS, Christos, ‘Τυπογραφία και τυπογράφοι στο Ελληνικό κράτος. Πρώτη προσέγγιση: Αθήνα, 1930-1990’ [‘Typography and typographers in the Greek state. First approximation: Athens 1930-1990’]. *Μνήμων* 24 (2002), 307-326.
- , ‘Ένας τυπογράφος στην Αθήνα του 20ού αιώνα. Προσωπικές και επαγγελματικές διαδρομές’ [‘A typographer in twentieth-century Athens. Personal and professional journeys’], *Μνήμων* 26 (2004), 240-256.

- MCDONALD, Robert, *Pillar and Tinderbox. The Greek Press and the Dictatorship*, (New York and London: Marion Boyars, 1983).
- MACGREGOR, Neil, *Germany. Memories of a Nation*, (London: Allen Lane, 2014).
- MACKRIDGE, Peter, *Language and National Identity in Greece, 1766-1976*, (Oxford: Oxford University Press, 2010).
- MARSHALL, Alan, *Changing the Word. The Printing Industry in Transition*, (London: Comedia Publishing Group, 1983).
- MASTORIDIS, Klimis, *Casting the Greek Newspaper. A Study of the Morphology of the Ephemeris from its Origins Until the Introduction of Mechanical Setting*. (Athens: ELIA, 1999).
- , ‘Μια συζήτηση με τον Σταύρο Βενέτη το καλοκαίρι του ’90’ [‘A conversation with Stavros Venetis in the summer of ’90’], *ΗΥΦΕΝ*, 3.1 (2001), 392-44.
- , ‘Καλλιτεχνικό τυπογραφείο. Σχέσεις αγάπης και μίσους με τα Ελληνικά στοιχειοχυτήρια’ [‘Artistic printing shop. A relationship of love and hate with the Greek type foundries’], *ΗΥΦΕΝ*, 3.1 (2002), 22-31.
- , ‘Cutting and casting Greek types in the nineteenth and twentieth century’, *Gutenberg Jahrbuch 2006*, 306-341.
- ΜΑΤΘΙΟΠΟΥΛΟΣ, Giorgos D., *Ανθολόγιο Ελληνικής τυπογραφίας [Anthology of Greek typography]*, (Herakleion: Crete University Press, 2009).
- , ‘Τα Ελληνικά τυπογραφικά στοιχεία. Παρελθόν και μέλλον. Ο ψηφιακός σχεδιασμός της νέας πολυγλωσσικής οικογένειας γραμματοσειρών Athens Academy’ [‘Greek types. Past and future. The digital design of the new multi-language typeface family Athens Academy’], in *The Printed Greek Book, 15th-19th century*. Acts of the International Congress. Delphi 16-20 May 2001, (Athens: Kotinos/Oak Knoll Press, 2004), 625-636.
- MARWICK, Arthur, *The Nature of History (Second Edn)*, (London and Basingstoke: Macmillan Press Ltd., 1981)
- MERGENTHALER LINOTYPE COMPANY, *The Big Scheme of a Simple Operation. A Primer on Linotype Mechanism and Operation*, (Brooklyn: Mergenthaler Linotype Company, 1940).
- METHENITIS, Georgios, ‘Επίσκεψη στο εκθετήριο της Linotype’ [‘A visit to the Linotype exhibition stand’], *Η Τυπογραφία*, Issue 250, Saturday 31 December 1969, 19.
- MITSΟΠΟΥΛΟΣ, Nikos, ‘Στοιχειοχυτήρια και στοιχεία’ [‘Type foundries and types’], *Η Τυπογραφία*, Issue 31-32, 10 January 1960
- ΜΟΥΖΕΛΙΣ, Nicos P., *Modern Greece. Facets of Underdevelopment*, (New York: Holmes & Meier Publishers, Inc., 1978).
- NICHOLAS, Maria, ‘A Brief History of Modern Greek Advertising, 1950-1999’, *ΗΥΦΕΝ*, 3.2 (2002), 7-37.
- NORTON, Robert, ‘Phototypesetting: Buyer Know Thyself’, in *Penrose Annual*, Vol. 69, ed. by Stanley Greenwood and Clive Goodacre, (London: Northwood Publications Ltd., 1976), 119.
- OSTERER, Heidrun and Stamm, Philipp, *Adrian Frutiger. Typefaces. The Complete Works*, (Basel: Birkhäuser, 2009).
- The Oxford Companion to Philosophy*, ed. by Ted Honderich, (Oxford: Oxford University Press, 2005).
- ΠΑΥΛΟΠΟΥΛΟΣ, Dimitris, ‘Τα πρώτα στοιχειοχυτήρια στη νεότερη Ελλάδα’ [‘The first type foundries in modern Greece’], *ΗΥΦΕΝ*, 1.1 (1998), 65-69.
- RE, Margaret, *Typographically Speaking. The Art of Matthew Carter*, (New York: Princeton Architectural Press, 2003).

- REED, Rosslyn, 'From hot metal to cold type printing technology', in *Technology and the Labour Process*, ed. by Evan Willis, (Sydney: Allen & Unwin, 1988), 33-50.
- ROMANO, Frank, *History of the Linotype Company*, (Rochester: RIT Press, 2014).
- ROSS, Fiona, 'Non-Latin Typesetting in the Digital Age', in *Computers and Typography 2*, compiled by Rosemary Sassoon, (Bristol: Intellect Books, 2002), 42-53.
- and Shaw, Graham, *Non-Latin Scripts. From Metal to Digital Type*, (London: St. Bride Library, 2012).
- ROSSETTO, Louis, 'The Linofilm Phototypesetting System', in *The Penrose Annual*, Vol. 51, ed. by R.B. Fishenden, (London and Bradford: Percy Lund, Humphries & Co Ltd., 1957), 94-101.
- SAFARIKAS, Μανος, 'Η τυπογραφία εκβιομηχανίζεται. Συμπεράσματα απο μια Διεθνή Έκθεση' ['Typography is being industrialised. Conclusions from an International Trade Fair'], *Ζυγός*, 8.94-95 (1963), 42-44.
- SASSOON, Donald, *The Culture of the Europeans. From 1800 to the Present*, (London: Harper Collins Publishers, 2006).
- SAVVIDIS, Manolis, 'Απλά προβλήματα' ['Simple problems'], *ΗΥΦΕΝ*, 1.1 (1998), 48-53.
- SEYBOLD, John W., *The World of Digital Typesetting*, (USA: Seybold Publications, 1984).
- SIGALAS, Antonios, *Ιστορία της Ελληνικής γραφής [History of the Greek script]*, (Thessaloniki: Centre for Byzantine Studies, 1974).
- SIMMONS, Colin and Leandros, Nikos, 'Printing and Publishing in Greece: "Flexibility" and the Process of Innovation, 1979-1991'. *Byzantine and Modern Greek Studies*, 20 (1996), 142-174.
- SKAZIKIS, I.M., 'Η τυπογραφία στην Ελλάδα', ['Typography in Greece'], *Ζυγός*, 2.22-23 (1957), 4-6.
- SKIDELSKY, Robert, 'The Growth of a World Economy', in *The Oxford History of the Twentieth Century*, ed. by Michael Howard and Wm. Roger Louis, (Oxford: Oxford University Press, 1998), 50-62.
- SKLAVENTIS, Triantafyllos E., 'Ο Χρίστος Μανουσαρίδης (1936-2008) και η εκδοτική άνοξη της Μεταπολίτευσης στο λυκόφως της μηχανικής στοιχειοθεσίας και της μεταλλοτυπίας' ['Christos Manousaridis (1936-2008) and the publishing resurgence during Metapolitefsi at the twilight of mechanical composition and metal type], in *Τυπογραφία και τυπογράφοι. Πρακτικά ημερίδας στη μνήμη του τυπογράφου Χρίστου Γ. Μανουσαρίδη [Typography and typographers. Minutes from a workshop in memory of the typographer Christos G. Manousaridis]*, ed. by Giannis Kokkonas, (Athens: EMNE, 2013), 19-58.
- ΣΤΑΙΚΟΣ, Sp. K. and Sklavenitis, T. E. (eds), *Πεντακόσια χρόνια έντυπης παράδοσης του νέου Ελληνισμού [Five hundred years of printed tradition of the new Hellenism]*, (Athens: Greek Parliament, 2000).
- SOUTHALL, Richard, *Printer's Type in the Twentieth Century. Manufacturing and Design methods*, (London and New Castle: British Library and Oak Knoll Press, 2005).
- , 'A Survey of Type Design Techniques Before 1978', in *Typography Papers 2*, ed. by Paul Stiff, (London: Hyphen Press, 1997), 31-59.
- , 'Technical History of Monotype Composing Machines', in *History of the Monotype Corporation*, ed. by Andrew Boag and Christopher Burke, (London and Woodstock: Printing Historical Society and Vanbrugh Press, 2014), 303-413.
- STEINBERG, S. H., *Five Hundred Years of Printing, (Third Edn)*, (London: Penguin Books, 1977).
- THERBORN, Göran, *European Modernity and Beyond. The Trajectory of European Societies, 1945-2000*, (London, Thousand Oaks and New Delhi: Sage, 1995).

- TOSH, John, *The Pursuit of History. Aims, Methods and New Directions in the Study of Modern History* (Fifth edn), (Harlow: Longman, 2010).
- TRACY, Walter, *Letters of Credit. A View of Type Design*, (London: Gordon Fraser, 1986).
- , *The Typographic Scene*, (London: Gordon Fraser, 1988).
- , 'Composing Room Days (and After)', *Printing Historical Society Bulletin*, no. 40, Winter 1995-96, 3-15.
- TRIPSAS, Mary, 'Surviving Radical Technological Change Through Dynamic Capability: Evidence from the Typesetter Industry'. *Industrial and Corporate Change*, 6.2, (1997), 341-377.
- , 'Unravelling the Process of Creative Destruction: Complementary Assets and Incumbent Survival in the Typesetter Industry', *Strategic Management Journal*, 18 (1997), 119-142.
- TSIAMBAOS, Kostas, 'Isotype diagrams from Neurath to Doxiadis', *Architectural Research Quarterly*, 16.1, (2012), 49-57.
- TWYMAN, Michael, *Printing 1770-1970*, (London: Eyre & Spottiswoode Ltd., 1970).
- , *The British Library Guide to Printing. History and Techniques*, (London: The British Library, 1998).
- UPDIKE, Daniel Berkeley, *Printing Types. Their History, Forms, and Use*, 2 vols, (London: The British Library; Delaware: Oak Knoll Press, 2001), i, 123.
- VALASAKIS, E., 'Γιατί τα Ελληνικά έντυπα είναι τόσο κακής ποιότητας;' ['Why are Greek publications of such poor quality?'], *Η Τυπογραφία*, Issue 49, 25 October 1960, 6.
- VLACHOS, Helen, 'The Colonels and the Press', in *Greece Under Military Rule*, ed. by Richard Clogg and George Yannopoulos, (London: Secker & Warburg, 1972), 59-73.
- VOSSOUGHIAN, Nader, *Otto Neurath. The Language of the Global Polis*. (The Netherlands: NAI Publishers, 2008)
- , 'Mapping the Modern City: Otto Neurath, the International Congress of Modern Architecture (CIAM), and the Politics of Information Design', *Design Issues*, 22.3, (2006), 48-65.
- VOUSINAKIS, Evaggelos A., *Εθνικό Τυπογραφείο – Εφημερίς της Κυβερνήσεως. 170 χρόνια στην υπηρεσία του Ελληνικού κράτους* [National Printing Office – Government Gazette. 170 years in the service of the Greek state], (Athens and Komotini: Ant. N. Sakkoulas Publishers, 2005).
- WALLIS, Lawrence W., *A Concise Chronology of Typesetting Developments, 1886-1986*, (London: The Wynkyn De Word Society, 1988).
- , *Typomania. Selected Essays on Typesetting and Related Subjects*, (Worcestershire: Severnside Printers Limited, 1993).
- , *Type Design Developments, 1970 to 1985*, (Arlington: National Composition Association, 1985).
- , *Electronic Typesetting. A Quarter Century of Technological Upheaval*, (Tyne & Wear: The Paradigm Press, 1984).
- , 'The Phototypesetting Jungle', in *Penrose Annual*, Vol. 63, ed. by Herbert Spencer, (London: Lund Humphries Publishers Limited, 1970), 213-223.
- WILKS, Christopher, 'Introduction: What was Modernism?', in *Modernism. Designing a New World. 1914-1939*, ed. by Christopher Wilks, (London: V&A Publications, 2006), 12-21.
- WRIGHT, Helena E., 'Photography in the Printing Press: The Photomechanical Revolution', in *Presenting Pictures*, ed. by Bernard Finn, (London: Science Museum, 2004), 21-42.

ZIZOPOULOU, Athena, 'Έμμισθες σχέσεις στα τυπογραφεία της Αθήνας' [Labour relations in the printing shops of Athens], in *Τυπογραφία και τυπογράφοι. Πρακτικά ημερίδας στη μνήμη του τυπογράφου Χρίστου Γ. Μανουσαρίδη* [Typography and typographers. Minutes from a workshop in memory of the typographer Christos G. Manousaridis], ed. by Giannis Kokkonas, (Athens: EMNE, 2013), 233-242.

Online sources

ABOUT LINOTYPE, <<http://www.linotype.com/48/aboutlinotype.html>> [accessed 11 February 2015]

THE BRITISH NEWSPAPER ARCHIVE <<http://www.britishnewspaperarchive.co.uk/search/results?newspaperTitle=Chelmsford%20Chronicle>> [accessed 2 November 2015].

COSTANTINOS A. DOXIADIS ARCHIVES, Bibliographical note (2013), <<http://www.doxiadis.org/page/default.asp?la=1&id=10>> [accessed 13 February 2013].

CORNELL UNIVERSITY LIBRARY, Guide to Joseph Leslie Crane Papers, 1927-1980, 1946-1965 (bulk) (2002), Division of Rare and Manuscript Collections. <<http://rnc.library.cornel.edu/EAD/htmldocs/RMMo2646>> [accessed 31 July 2013].

DOXIADIS, Constantinos, 'Ekistics. The Science of Human Settlements'. <http://www.doxiadis.org/Downloads/ecistics_the_science_of_human_settlements.pdf> [accessed 31 July 2013].

DOXIADIS, Constantinos, 'Anthropocosmos. The World of Man'. <http://www.doxiadis.org/Downloads/Anthropocosmos.%20The%20World%20of%20Man%20me%20ologo_.pdf> [accessed 21 November, 2015].

EKISTICS, Ekistics. The science of human settlements (definition) (2013), <<http://www.ekistics.org>> [accessed 31 July 2013].

EKISTICS, Ekistics. The Journal (2012), <<http://www.ekistics.org>> [accessed 31 July 2013].

ETHNIKO TYPOGRAFEIO (National Printing Office), Ιστορική Αναδρομή (2013). <<http://www.et.gr/index.php/ethinko-typografeio/71-2009-09-18-13-21-27/5-since1825>> [accessed 13 September 2013].

FONT BUREAU, 'A Tribute to Mike Parker, 1924-2014', <<http://www.fontbureau.com/mikeparker>> [accessed 1 August 2016].

HAAS TYPE FOUNDRY, Linotype company website (2015). <<http://www.linotype.com/3394/haastypefoundry.html>> [accessed 14 August 2015].

HOLLIS, Richard, 'Jan Tschichold: A Titan of Typography', The Guardian Online, Friday 5 December 2007, <<http://www.theguardian.com/artanddesign/2008/dec/05/jan-tschichold-typography>> [Accessed 1 September 2015].

LEONIDAS, Gerry, 'Greek Sript: A History by Gerry Leonidas'. Typophile forums, 23 August 2005, <<http://typophile.com/node/14789>> [accessed 21 November 2012].

MCLEAN, Ruari, 'Obituary: Walter Tracy', The Independent, Monday 1 May 1995, <<http://www.independent.co.uk/news/people/obituary-walter-tracy-1617836.html>> [accessed 13 February 2013].

MOSLEY, James, Scotch Roman (2007), <http://typefoundry.blogspot.co.uk/2007_02_01_archive.html> [accessed 15 February 2015].

SHAW, Paul, 'An Interview with Matthew Carter', 2 March 2011, Print magazine. Online. <<http://www.printmag.com/interviews/an-interview-with-matthew-carter/>> [accessed 15 January 2013].

TSIAMBAOS, Kostas. 2010. 'Η αρχιτεκτονική επιστήμη' ['The architectural science']. Online. kostastsiambaos.blogspot.co.uk/2010_12_01_archive.html> [accessed 29 July 2013].

Unpublished sources

EMMANOUIL, Marina, *Graphic Design and Modernisation in Greece, 1945-1970*. Unpublished PhD thesis, Department of History of Design, Royal College of Art/Victoria & Albert Museum, 2012.

HOFFMAN, Phyllis R., *Matthew Carter Reflects on Type Design*. Unpublished MSc dissertation, School of Printing Management & Science, College of Imaging Arts and Sciences, Rochester Institute of Technology (RIT), Rochester, New York, 1999.

SAVOIE, Alice, *International Cross-currents in Typeface Design: France, Britain and the USA in the Phototypesetting Era*, unpublished PhD thesis, Department of Typography & Graphic Communication, University of Reading, 2014.

ZAZAS, Dimitris, *Τυπογραφία και τυπογράφοι στην Νεότερη Ελλάδα: η περίπτωση της Αθήνας (1870-1920)*, [*Typography and typographers in Modern Greece: the Athens case (1870-1920)*], unpublished PhD thesis, Department of Sociology, Panteion University of Social and Political Sciences, Athens, 2011.

ZIZOPOULOU, Αθηνά, *Τυπογράφοι και εργάτες τύπου στην Αθήνα τον 20ό Αιώνα: συγκρότηση και εξέλιξη ενός επαγγελματικού χώρου* [*Typographers and press workers in twentieth-century Athens: formation and evolution of a professional field*], unpublished PhD thesis, Department of History & Archaeology, University of Crete, 2006.

Interviews

AVRONIDAKIS, Nicholas, email interview, Athens, Greece, 14 June 2017.

CARTER, Matthew, personal interview, TypeCon, Washington D.C., USA, 2 July 2014.

KABOURI, Maro, personal interview, Athens, Greece, 28 June 2017.

KATSOULIDIS, Takis, personal interview, Athens, Greece, 13 July 2017.

PAPANIKOLAOU, Tania, email interview, Athens, Greece, 19 July 2017.

ZARABOUKA, Sophia, personal interview, Athens, Greece, 27 May 2017.

Archives

Archive of Visual Communication in Greece, Athens, Greece

ATHENS PUBLISHING CENTER, *Δειγματολόγιο Στοιχείων* [*Type Specimen*], circa 1971-72. Archive of Visual Communication in Greece.

Constantinos A. Doxiadis Archive, Athens, Greece

DA REVIEW, 'New printing installations for the DA Review', 2.22 (1966), 17, 2-5, CADA.

DA REVIEW, 'New look for DA house organ on ten year anniversary', 67.6 (1970), CADA.

DOXIADIS, Constantinos, internal memo, 'Ίδρυση μονάδας γραφικών τεχνών' ['Establishment of graphic arts unit'], 27 April 1966. "Signs by C.A. Doxiadis (SD-DC) Concerning Doxiadis Organization activities (1965-1971)", (Archive Files 19025), CADA.

DOXIADIS, Constantinos, company memo, 'Σκέψεις πάνω στην τυποποίηση των σελίδων μας' ["Thoughts on the standardisation of our pages"], 1 June 1970, 1-2. General Scientific Matters: Publications through Athens Publishing Center, CADA.

Linotype Greek Archive, Department of Typography & Graphic
Communication, University of Reading, U.K.

ANON., 'Non-Romans, Greek, cont'd.', office document, 20 March 1979. Unsorted, LGA, DTGC.

ANON., 'Plan for next Greek typefaces', office document, 21 March 1979. Unsorted, LGA, DTGC.

AVRONIDAKIS, Nicholas to Mike Parker, 17 July 1971. Unsorted, LGA, DTGC.

CARTER, Matthew to Mike Parker, 'Optima Medium Greek', memo, 10 August 1972. Unsorted, LGA, DTGC.

CARTER, Matthew to Tim Holloway, 'Baskerville Greek Upright', 26 January 1977. Unsorted, LGA, DTGC.

CARTER, Matthew to Tim Holloway, 2 March 1978. Unsorted, LGA, DTGC.

CARTER, Matthew to Lennie Battipaglia, 28 November 1978. Unsorted, LGA, DTGC.

CARTER, Matthew to Lennie Battipaglia, 'Baskerville Greek', 8 January 1979. Unsorted, LGA, DTGC.

CARTER, Matthew to Bruce Lehnert, 26 March 1979. Unsorted, LGA, DTGC.

CARTER, Matthew to René Kerfante, 28 July 1980. Unsorted, LGA, DTGC.

CHRYSOCHOIDES, Costas to Mike Parker, 'Century Schoolbook Greek', 9 June 1976. Unsorted, LGA, DTGC.

CHRYSOCHOIDES, Costas to Stempel, 14 July 1980. Unsorted, LGA, DTGC.

HOLLOWAY, Tim, 'Baskerville Greek Upright', office document, 24 September 1977. Unsorted, LGA, DTGC.

PARKER, Mike to Robert Pegg, 18 January 1971. Unsorted, LGA, DTGC.

PEGG, Robert to Mike Parker, 'Re: Proposed Layout for Greece', 4 March 1971. Unsorted, LGA, DTGC.

ZAPF, Hermann to Mike Parker, 21 May 1971. Unsorted, LGA, DTGC.

Mergenthaler Linotype Company Records, National Museum of American
History, Washington D.C., U.S.

ANON., 'The Standard V-I-P Library and how to order fonts', undated typescript. Label V-I-P Products, File Fonts and Layouts, Box 1, NMAH.

BOLANDER, Tage to Costas Makris, 13 December 1973. Label V-I-P Products, File V-I-P Greek PF24-3/V-I-P/Products (Old)/Technical, Box 1, NMAH.

BURKE, Jackson to Walter Tracy, 'Re: Greek', 21 April 1961. File Greek Miscellaneous, Box Historical (3/3), NMAH.

CHRYSOCHOIDES, Costas to Walter Tracy, 26 June 1962. File Greek Miscellaneous, Box Historical (3/3), NMAH.

CHRYSOCHOIDES, Costas to Walter Tracy, 26 June 1962. File Greek Miscellaneous, Box Historical (3/3), NMAH.

CHRYSOCHOIDES, Costas to Mike Parker, 5 August 1964. File Caledonia Greek, Box 6, NMAH.

CHRYSOCHOIDES, Costas to Walter Tracy, 3 December 1964. File Caledonia Greek, Box 6, NMAH.

CHRYSOCHOIDES, Costas to Walter Tracy, 18 December 1964. File Caledonia Greek, Box 6, NMAH.

BIBLIOGRAPHY

- CHRYSOCHOIDES, Costas to Walter Tracy, 29 December 1964. File Caledonia Greek, Box 6, NMAH.
- CHRYSOCHOIDES, Costas to Messrs, Mergenthaler Linotype Company, 16 November 1965. File Caledonia Greek, Box 6, NMAH.
- MAKRIS, Costas to Mike Parker, 21 September 1973. Label V-I-P Products, File V-I-P Greek PF24-3/Products (Old)/Technical, Box 1, NMAH.
- PARKER, Mike to Walter Tracy, 'Caledonia Greek', 9 October 1963. File Caledonia Greek, Box 6, NMAH.
- PARKER, Mike to Walter Tracy, 'Caledonia Greek', 14 October 1963. File Caledonia Greek, Box 6, NMAH.
- PARKER, Mike to Walter Tracy, 27 April 1964. File Caledonia Greek, Box 6, NMAH.
- PARKER, Mike to Costas Chrysochoides, 17 July 1964. File Caledonia Greek, Box 6, NMAH.
- PARKER, Mike to Walter Tracy, 'Caledonia Greek', 15 January 1965. File Caledonia Greek, Box 6, NMAH.
- PARKER, Mike to George Ostrochulski, internal memo, 'Subject: Linotype Caledonia Greek', 26 January 1965. File Caledonia Greek, Box 6, NMAH.
- PARKER, Mike to Walter Tracy, 'Caledonia Greek', 17 May 1965. File Caledonia Greek, Box 6, NMAH.
- PARKER, Mike to Walter Tracy, 'Caledonia Greek', 30 August, 1965. File Caledonia Greek, Box 6, NMAH.
- PARKER, Mike to Tage Bolander, 22 February 1972. Label V-I-P Products, File V-I-P Greek PF24-3/V-I-P/Products (Old)/Technical, Box 1, NMAH.
- PARKER, Mike to Matthew Carter, 29 June 1972. File Matthew Carter, Box 3, NMAH.
- PARKER, Mike to Matthew Carter, 'New Greek Typeface', 11 April 1973. File Matthew Carter, Box 3, NMAH.
- PARKER, Mike to Costas Makris, 23 July 1973. Label V-I-P Products, File V-I-P Greek PF24-3/V-I-P/Products (Old)/Technical, Box 1, NMAH.
- PARKER, Mike to Tage Bolander, 26 November 1973. Label V-I-P Products, File V-I-P Greek PF24-3/Products (Old)/Technical, Box 1, NMAH.
- PARKER, Mike to Costas Chrysochoides, 17 June 1974. File Foreign Miscellaneous, Box 3, NMAH.
- PARKER, Mike to P. Davias & Sons Printing House, 27 June 1974. File Foreign Miscellaneous, Box 3, NMAH.
- PARKER, Mike to Derek Kyte, 'Subject: 303 Greek Keyboard', 31 July 1974. File Linotype Paul/June 1973, Box 3, NMAH.
- PARKER, Mike to Matthew Carter, 6 August 1974. File Matthew Carter, Box 3, NMAH.
- PARKER, Mike to Costas Chrysochoides, 11 December 1974. File Foreign Miscellaneous, Box 3, NMAH.
- PARKER, Mike to Costas Chrysochoides, 'Subject: Century Schoolbook Greek', 15 March 1976. File Foreign Miscellaneous, Box 3, NMAH.
- ROSSETTO, Louis to Jackson Burke, internal memo, 'Greek Alphabet', 5 September 1963. File Greek Miscellaneous, Box Historical (3/3), NMAH.
- TRACY, Walter to Jackson Burke, 'Greek', 11 April 1963. File Greek Miscellaneous, Box Historical (3/3), NMAH.

- TRACY, Walter to Mike Parker, 'Caledonia Greek', 11 October 1963. File Caledonia Greek, Box 6, NMAH.
- TRACY, Walter to Mike Parker, 'Greek', 1 May 1964. File Caledonia Greek, Box 6, NMAH.
- TRACY, Walter to Costas Chrysochoides, 'Caledonia Greek', 21 December 1964. File Caledonia Greek, Box 6, NMAH.
- TRACY, Walter to Mike Parker, 'Caledonia Greek', 21 December 1964. File Caledonia Greek, Box 6, NMAH.
- TRACY, Walter to Mike Parker, 'Caledonia Greek', 19 January 1966. File Caledonia Greek, Box 6, NMAH.
- TRACY, Walter to Matthew Carter, 6 July 1972. Label V-I-P Products, File New Gr Type/V-I-P Products (Old)/Technical, Box 1, NMAH.

The Type Archive, London, U.K.

MONOTYPE CUSTOMER RECORDS, 'Greece, Holland, Hungary, Italy'.

Walter Tracy Correspondence, Department of Typography & Graphic Communication, University of Reading, U.K.

- AVRONIDAKIS, Nicholas to David J. Tyrwhitt-Drake, 16 October 1969. File 30, Photocomposition, WTC, DTGC.
- CARTER, Matthew to Walter Tracy, telex, 1 April 1970. File 20, Greek, WTC, DTGC.
- CHRYSOCHOIDES, Costas to Walter Tracy, 'L&M Matrices Discontinuance', 19 February 1971. File 20, Greek, WTC, DTGC.
- PARKER, Mike to John Parsons, 19 October 1965. File 17, Non-Roman General, WTC, DTGC.
- PARKER, Mike to Walter Tracy, 'Greek for Linofilm Quick', 16 December 1969. File 30, Photocomposition, WTC, DTGC.
- PARKER, Mike to Albert Salt, 'Athens Publishing Center, Athens - Greece', 18 December 1969. File 20, Greek, WTC, DTGC.
- PARKER, Mike to Albert Salt, 'Athens Publishing Center, Athens, Greece', 26 January 1970. File 20, Greek, WTC, DTGC.
- PARKER, Mike to Albert Salt, 'Athens Publishing Center, Athens, Greece', 6 February 1970. File 20, Greek, WTC, DTGC.
- PARKER, Mike to Walter Tracy, 10 February 1970. File 20, Greek, WTC, DTGC.
- PARKER, Mike to Nicholas Avronidakis, 9 March 1971. File 20, Greek, WTC, DTGC.
- PARKER, Mike to Walter Tracy, 11 May 1972, File 30, Photocomposition, WTC, DTGC.
- PARKER, Mike to Robert Caesar, 7 June 1971. Folder 30, Photocomposition, WTC, DTGC.
- POPHAIDES, Costas to Ralph Goodman, 'Re: Greek matrices', 31 December 1969. File 20 Greek, WTC, DTGC.
- SALT, Albert to Mike Parker, Athens, 'Greece — Greek text and display faces', 27 January 1967. File 20, Greek, WTC, DTGC.
- SALT, Albert to Walter Tracy, 'VIMA, Athens (Prop. of Mr. Dim. Lambrakis) — Exclusive rights to new face for news-paper composition', 21 April 1969. File 20, Greek, WTC, DTGC.
- SALT, Albert to David Tyrwhitt-Drake, 'Athens Publishing Center, Athens, Greece', 22 October, 1969. File 30, Photocomposition, WTC, DTGC.
- SALT, Albert to Mike Parker, 'Athens Publishing Center, Athens, Greece', 29 December 1969. File 20, Greek, WTC, DTGC.

- TRACY, Walter to John Parsons, internal memo, 'Caledonia Greek', 6 February 1968.
File 20, Greek, WTC, DTGC.
- TRACY, Walter to Costas Chryssochoides, 16 February 1968. File 20, Greek, WTC, DTGC.
- TRACY, Walter to Albert Salt, 'Vima Athens', draft, April 1969. File 20, Greek, WTC, DTGC.
- TRACY, Walter to Mike Parker, 'Super Quick: Greek', 21 October 1969. File 30,
Photocomposition, WTC, DTGC.
- TRACY, Walter to Costas Chryssochoides, 19 June 1969. File 20, Greek, WTC, DTGC.
- TRACY, Walter to Ralph Goodman, 'Greek Type Faces', 20 January 1970. File 20, Greek,
WTC, DTGC.
- TRACY, Walter to Costas Chryssochoides, 'L&M Matrices discontinued', 25 February 1971.
File 20, Greek, WTC, DTGC.
- TRACY, Walter to Mike Parker, 'V-I-P and 505', 24 April 1972, File 30, Photocomposition,
WTC, DTGC.
- TRACY, Walter to Matthew Carter, 'Optima Medium Greek', 4 July 1972. File 20, Greek,
WTC, DTGC.
- TYRWHITT-DRAKE, David to E.S. Emery and Walter Tracy, report, 'DJTD/JQ. Nicholas
Avronidakis - Manager, Athens Publishing Center Graphic Arts Co. Ltd., 39,
Demokritou Street, Athens 136', 20 October 1969, File 30, Photocomposition, WTC,
DTGC.
- WALKER, Arthur H. to Mike Parker, 'Helvetica Greek', 7 April 1971. File 20, Greek, WTC, DTGC.
- Walter Tracy Papers, St. Bride Library, London, U.K.
- LINOTYPE LOOK, 'Appointments. David Tyrwhitt-Drake', 1 (1973), 7. Box 5, WTP, SBL.
- , 'Our National Figure...', 1 (1973), 3. Box 5, WTP, SBL.

