Pictorial Information Systems and the Teaching Imperative

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1. The general issues: towards new interpretations

Our students live amidst images; as a general rule they have not been armed with the ability to 'read' them. They witness a curious and unprecedented fusion of technology, imagination, necessity, philosophy and production which is continuously creating new images, many of which are changing the culture within which we live. Both the presentation of still, moving images and computer imaging itself have the potential for a dramatic impact on the visual culture with which the historian must work. Most of the current uses of computer imaging are of an integrative character, colonizing older established media such as photography, video and cinema.[1] While this development initially spawned the notion of 'hypermedia' and its attendant idea of access and intellectual participation, it also enables the historian to probe more deeply than has previously been the case into the nature of the visual evidence from which new interpretations can be derived.

Faced with such a powerful and integrative technology the task of historians is to understand and influence the development of good practice which may more effectively allow them to establish new forms of evidence and stimulate new interpretations. In this Chapter we provide an overwiew of a prototype dataset designed to stimulate a criticism of the historiography of contemporary Yugoslavia. We discuss the technical issues which surround the creation of such a 'dataset' and the 'navigation instruments' which a might be used by a 'user'. Though we have attempted to devise an 'Open Environment', and 'generic tools' which can be implemented by any user, we are aware that the act of 'authoring' whether of 'links' or a HiDES ITS always implies interpretation. Nonentheless we are convinced that the environment provided by Microcosm enables a student to identify the values or 'messages' embedded in the use which authors have made of the visual images they employ in a way which is impossible for those authoring in traditional hypermedia.

For it can be argued that traditional hypertext authoring techniques are treacherous, they embody an 'implicit' rather than 'explicit' interpretation. What can be said of text applies equally to images, where technology is evolving in such a way that representation can be mastered as 'reality'. Constructing software structures which encourage the historians of the contemporary world to evaluate the plethora, and, most imporatantly, to distinguish simulation, in all its forms, from recording is in itself a worthy task.

These larger issues are inherently critical to teaching, but in Britain they have largely been left to one side. For in a rush to employ new information technologies for a variety

[1] Andy Darley, "Big Screen, little screen: the archaeology of technology" in *Digital Dialogues* Vol 2. No.2 p.82.

of motives, many of which are irrelevent to this debate. It is vital that software engineers ignore the utilitarianism driving contemporary developments in the UK and concentrate on the issues which academics confront in conducting their research. We must beware lest the current context within which 'history CBL software' is being created challenges and concentrate on the ways in which such software stimulates the emergence of new interpretations. We argue that it is the dynamics of a clash of new interpretations which will ultimately immerse historians of all persuasions in new software and new technologies. Debate between historians, Geyl's stuff of history, rather than the bland acceptance of nostrums of the pundits of so-called 'more economic' means of 'delivering learning' will ultimately lead to the adoption of new and powerful technologies on an impressive scale.[2]

As teachers we face an unusual challenge; to address the 'history' written in these media, and use the tools provide by the new technologies to hone the critical methods which historians have long used so that students do not easily or worse still automatically accept 'screen images' as 'fact'. At one level such a task has its own own imperative in stimulating the student to contexualize photomontage images — often propaganda, so as to understand their contribution to the interpretation of an historian. At the same time the ability to deconstruct images should stand neophyte young historians in good stead as critics of their colleagues' and contemporaries use of image as illustration rather than analysis.[3]

The previous experience of the HiDES Project suggested that new imaging technologies could be employed within Microcosm's open environment to enable colleagues to produce teaching packages (an ITS running native to Microcosm using stills and video images with appropriate texts and sound) to tutor students in the critical use of images as evidence. The advent of videodisc and the impressive range of powerful workstations using the Intel i386 — i486 chip have stimulated the development of teaching packages which couple the techniques of early versions of HiDES, Southampton's Intelligent Tutoring System with the intellectual advantages provided by hypertext. Such packages allow the student to manipulate film, stills, audio, maps, text and statistical evidence, using proprietary applications. Five are now in the course of development in a joint project, using the resources available to two collaborating laboratories in Microcosm (in the Department of Electronics and Computer Science) and HiDES (in the Department of History).

While the preparation of multimedia datasets uses techniques developed over several years of practice, the new software and hardware environment provided by Microcosm-HiDES has meant that some fundamental modifications have taken place. The mastering of videodisc demands an entirely different approach to the way in which sources are organised and viewed, while the use of visual sequences on the one hand, and powerful data or text-retrieval applications on the other, poses significant issues in terms of programming, data organisation and retrieval. The scale of the operation undertaken is formidable, the

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[2] Paul Ramsden, "Lost in the Crowd?", *Times Higher Education Supple*ment, July 13th 1992, p.15.

[3] Tim Druckrey, "Deadly Representations or Apocalpse Now." in *Digital Dialogues* Vol 2. No.2. p.17. The article, a telling analsis of the imagery of the Gulf War, refers to that episode of human history as 'history expressed through the neutrality of images'.

standard laservision videodisc can house 110,000 images, each of which might conceivably have to be tagged, catalogued and furnished with its appropriate intellectual tools, on the other hand a database, such as the one used in the Project's Viana database might have 500,000 entries. The advantages of a powerful multimedia software platform such as Microcosm, which allows a user to save and retrieve links while providing navigation tools and output to a professional word-processing environment become self-evident.[4] This work is currently implemented in Microsoft Windows 3.1 on an i386 or i486 system using up to 8MBytes RAM and 320MBytes hard disc,interfaced with videodisc players, audio systems and optical disc drives (WORM or CD-ROM) as appropriate.[5] Given their considerable power and versatility such systems are likely to comprise the future generation of 'history workstations' for both research and teaching.

Five new 'teaching-research' datasets are now designed to be housed on videodisc and hard disc and have been developed as discrete publications in their own right — together with appropriate hard copy. These new datasets, of which 'War and Civil War in Yugoslavia, 1941-45' is the first, are designed within the technical universe of a multimedia environment. Students can pursue an enquiry, retrieving, examining and utilising the materials of their choice, running applications (e.g. for the purposes of handling large files or databases as appropriate) while working up data for subsequent publication. A 'resources file' (listing the types of sources available on the system, and a range of specific 'help' files) can be used as a starting point for research, while Notepad facilities serve as a collection point for data which might subsequently be transferred to a word-processing package for desk-top publishing. Current prototypes use Microsoft 'Word for Windows' for such a task.

While the HiDES ITS with its inherent 'rules of dialogue' can be provided to a student as a simple form of 'help', one which has been authored as a subtle and powerful manner. The student might be urged to use the Notepad as a means of 'opening up' the discussion. HiDES could also be consulted by a student attempting an essay or project on this or an allied topic, and seeking information through the exploitation of domain files designed for this purpose. 'Authoring routines' have been developed using one of the 'modes' specified

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[4] For a technical description of Microcosm see: Fountain, A., Hall, W., Heath, I. & Davis, H. "MICROCOSM: An Open Model for Hypermedia With Dynamic Linking". *CSTR* 90-12, Department of Electronics and Computer Science, University of Southampton, 1990. A detailed description of a case study using Microcosm to manipulate the files from a major corpus may be found in F.Colson and W.Hall 'Prologue to Partition — Viceroy Mountbatten and the handling of the I.N.A. Crisis — a Multimedia HiDES', *History and Computing* Vol.3. No.1. pp. 89-98.

[5] This dataset is described in 'Microcosm-HiDES — An example from a teaching dataset' Wendy Hall and Frank Colson with Ian Heath, Jean Colson and Heather Williams. Presented at the IV Conference of the U.K Branch of the AHC, Southampton, April 12th, 1991. — The author is deeply indebted to the assistance received from Heather Williams and Stefan Pavlowitch in providing ideas and challenging materials to the joint team. This package was first shown in prototype form in Southampton on April 12th, and uses the full range of Microcosm's facilities. Ian Heath, Jean Colson and Wendy Hall programmed the links used in the package — only a portion of which was demonstrated.

in existing HiDES manuals and developed by the Project over the last three years. Such routines assume that a student would have access to Library facilities, and would be preparing a paper for discussion at a subsequent seminar.

The student who wishes to understand the social and economic roots of the Yugoslav Civil War of 1941-45 faces some formidable problems.[6] For, as can be imagined the conflict in this fragmented society was not only vicious, but highly complex — its outcome the reflection of deep fissures in the society of that region of the Balkans. It began with the predominately Serbian coup d'etat of March 1941 and deepened with the countervailing action of Croatian separatists. The division of the country among its Axis neighbours and the establishment of the NDH (the Axis puppet state of Greater Croatia), as well as the occupation by the armies of Germany, Italy and Bulgaria, further complicated the situation. Furthermore the emergence of two contending resistance movements within the area of German-occupied Serbia meant that it was difficult for the Western Allies to gauge the extent of resistance to the Axis. A crucial question in studying the war in Yugoslavia is what exactly were the factors which made the British first back General Mihailowitch and his Yugoslav Army of the Homeland (Chetnicks), then switch to supporting the Partisans led by Tito, Secretary General of the Communist Party of Yugoslavia.

For a good deal of the War Yugoslavia was regarded as a sideshow, the emergence of resistance was initially viewed as a goood morale booster for the other occupied peoples of Europe and for the British at a time when the Axis powers effectively dominated almost the whole area of Europe. The conflict between the Chetniks, and the Partisans assumed a crucial significance when it threatened to impinge on the cooperation between the Western Allies and the USSR and when Yugoslavia became strategically important in the deception plan to distract the Axis from the landings in Sicily and to divert forces from the Eastern Front when it became apparant that a Second Front could not be opened in Western Europe in 1943.

The sheer variety of data contained in the package, film, videodisc, collections of printed and (transcribed) manuscript sources, poses a significant didactic problem. The student is therefore invited to look at an introduction written for the package together with a HiDES ITS routine designed to encourage the systematic exploration of the subject. One tactic taken by the authors invites a student to use this vast array of evidence to consider the role which resistance to the Axis might have played in the strategic thinking of the Allies, especially the British. There were undoubtedly advisors to SOE in Cairo and London who argued that the most valuable form of resistance was sabotage. In the Yugoslav case the cutting of the railway links between Germany and Greece was seen as directly beneficial to the Allied cause, while the impact of sabotage on the morale of occupied Europe was thought to be of general utility. Given that the civil war between Chetniks and Partisans was a fact of life in much of Yugoslavia throughout the years of

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[6] The possibilities of DVI as a route for storage/access are currently under investigation. There is a strong case to be made for transputer power to be used in dealing with the compression/decompression problems associated with the handling and storage of large numbers of images. The group is aware of this possibility, but is clear that the software interface will have to be far easier to manipulate than appears to be the case at present.

the war, it might be reasoned that Allied support would be provided for whichever of the two groups could guarantee to conduct the most effective sabotage operations.

If this policy had been apparant to the Chetnik leadership they would have perceived a dilemma. For General Mihailovic, appears to have been attempting to build up a 'secret army' preparing for an *Ustanak* (General Rising) once the Allies reached the Balkans, and was therefore anxious to assume a strictly defensive role, husbanding his resources against the virtual certainty of massive German reprisals and conducting a vicious but piecemeal war with the Ustasa (Croatian Fascists) forces in the NDH and the Partisans alike. A student could appreciate Mihailovic's strategy by reflecting on the ethnic geography of German-occupied Serbia, as well as Croatia, by viewing film data, stills of the 'normality of peasant life' and images of the enlistment of Chetnick forces. Mihailovic's dispositions and strategic assumptions may well become clear, as might his strategic thinking. The imagery of a peasant society at its timeless pursuits in Serbia proper illustrates the continuity of society and the defensive strategy of Mihailovic. It stands in vivid contrast to the plight of Serbs living in the NDH whose society was being destroyed by the Ustasa persecution.

Tito's forces, many of whom consisted of Serbs from the NDH, have a different appearance; as their leader sought to instill a sense of 'modernity' which he believed to be inherent in the 'revolutionary war'in which he was engaged. Images were powerful — they had a powerful meaning in both Yugoslavia and elsewhere, the traditionalist Mihailovic and the modern-revolutionary Josep Broz Tito were both in contact with the Allies, and agents were sent by the Special Operations Executive (SOE) to encourage resistance.

The accounts of the agents sent in to contact Mihailovic and Tito reflected the policies and images of the two military leaders and their forces as well as those of the agents themselves. The latter can best be appreciated both by a textual analysis of their dispatches and a reading of the photographic images they collected. The interpretation of such evidence has naturally given rise to a substantial scholarship. The student can examine excerpts from various accounts of the conflict, including those of Lees and Deakin; analysing their language; their views on the military value to the Allies of either Partisans or Chetnics are in clear contrast.

The problem with students of this period is that they may be defeated by the plethora of evidence, maps, oral files, videodisc materials, images which might be used to debate the issues raised by other scholars. A file written by an historian provides for an ITS which addresses a specific episode in the tortuous relationship between Mihailovic and the British, a request from London to cut the line between Belgrade and Salonika by destroying the Ibar bridges. Maps, contemporary plans, audio and stills are brought into play in an attempt to evaluate the real significance of this operation. For, though meticulously planned and clearly well within the capabilities of both the Chetniks and their British and US advisors, the operation was suddenly aborted by direct command from London.

The wealth of detail provided for the students allows them to place the reasoning behind London's decision — arguably a decisive one for the fate of Yugoslavia — into a larger context. For much of the reasoning behind London's decision to support the Partisans may well have been based upon the premise that Mihailovic's forces were compromised with the German occupying forces rather than a deeper comprehension of the nature of the contesting movements and the extent to which the Chetniks were a force whose fundamen-

tal strength lay in the degree of support which it received from the royalist peasantry of Serbia and the surrounding regions. Such an analysis necessarily leads the student to look very closely at the social structure and demography of the regions under study, utilising evidence from a range of statistical sources, stills and film, held in other applications (in this case Superbase 4, or and Excell) accessible from within Microcosm. While the package has initially been trialled for student use during 1991-92, it is quite clear that it will become a powerful stimulant to student use.

A second package is designed to probe the ambiguities of national identity in France under the Third and Fourth Republics, using the idea of 'Outsiders', namely Alsacians and Jews as a prism through which to allow the student to develop a wider understanding of the social and political context of France under German occupation. Stills and short 'factoids' have largely been used by the authors of the package, and the powerful yet evanescent quality of images is seen as catalytic; enabling the student to develop insights which can best be exploited using both text and image handling applications. The film-documentary *Au Revoir Les Enfants* is shown in this context as a foil, through which the historiography of that episode can be assessed, drawing upon archival resources and case-studies.

The fact that Microcosm uniquely provides the historian with the ability to carry out simultaneous analysis of film and allied media means that at long last film can be used as an effective tool for the discussion, rather than the mere illustration of social structures and the perception of change within them. Using Microcosm to archive, control and dissect the visual image (a process than involves the manipulation and transposition of images), the historian can assess film as document — how and why were films made, these images edited, these dialogues inter-cut, unpacking the myriad editorial and scripting decisions which can then expose the power of the film as document.

There is a further and crucial difference between the study of Yugoslavia and that of France. In the latter the interactive notepads will not only respond to student comment in a standard CBL fashion, but they will also be prompted by students' use of both generic and specific links so as to enable a student's progress and 'implicit argument' to be charted for future use in a tutorial. In this sense both student and tutor would not merely be looking at the results of an investigation, but would be able to trace the way in which it had been undertaken.

Clearly the range of resources which can be provided and the effectiveness of the exercises which run using powerful applications, allied to the greater sophistication of newer varients of Microcosm (which will use artificial intelligence in the shape of expert systems as an engine through which to parse the linkage data stored under Microcosm) enable those using computer based teaching to respond to the central questions of interpretation explicitly discussed by the historians working in a given field. This is because the student can be prompted by the knowledge stored in generic and specific links generated by the authors to sift through a range of evidence responding to an driginal enquiry rather than one 'setup' through HiDES. The way in which this will work is at present under examination, but the multitudinous numbers of links created by a student's examination and the extent to which such links can become complex make it imperative that a powerful 'engine' is installed, so as to generate efficient responses and to make authoring a task which is

possible within the resources available to the historian-author and retain a high degree of intellectual satisfaction.

Though we can only begin to hazard a guess at this stage, it is our contention that two things will happen — a student who uses such a system will be able to question the use to which historians have put evidence in a powerfully systematic way, at the same time the authors, and prospective tutors will have had their intellectual assumptions ruthlessly laid bare.

Figure 1: Screen dump 'The crowd with a portrait of Tito'

2. The Tools of the Trade. A User's View of a Microcosm-HiDES 'Package':
'The Civil War in Yugoslavia, 1941-45'.

Students have recently been using the images and text-files available in the 'Yugoslav Civil War, 1941-45' and work in this area is sufficiently well advanced to provide examples of the tools which might be used by students in the course of their work. The resources available to them are vast, they include primary manuscript and printed sources (the former in transcribed and facsimile); secondary works (UK and other); maps (created for the purpose); still photographs; visual abstracts (moving icons created for the purpose); videodisc materials (a comparison with the Danish experience 1940-45 — designed to provoke discussion); and audio materials comprising both commentaries and interviews from those who played a role in the civil war. A 'Contents' file also provides for a 'glossary of terms', 'dictionary', and HiDES Help screen — available through 'buttons'. Microcosm's open structure means that these can be rapidly accessed.

The Screen shot [figure 1] illustrates the 'resources' file (containing the list of contents), a 'tour' file has been designed which will enable students to contrast the images produced during the coup of March 1941 which brought the pro-Allied government of King Peter to power, and those produced during the celebration of that event four years later under Tito. This 'tour' has activated a photograph of 'The Crowd with a portrait of Tito', a HiDES 'help' file (containing an 'interpretation' of the events of 1941-45), and a 'History' which indicates that the user has viewed the first of a sequence of pictures of the commemorations of the coup of 1941 which took place in March 1945. The historian's 'reading' of these photographs is open to criticism from the students using the 'Tour File'. This facility, (available through a 'Mimic' Icon) provides a sequence of still and moving images which allow a user to do two things: to 'tour' the resources (following a 'slide show' through the materials to hand with an audio commentary closing with a HiDES screen): to gain an overview clearly incorporating an 'historian's view' of the course of events in Yugoslavia 1941-45. The 'Tour' has been devised in such a way that it takes the user through the range of resources available on the system, including audio and video. A user does not need to be constrained by the sequence of files displayed in the 'mimic', but can use links which may be consulted via a text file to 'jump off' to exploit the text and other resources at any point in the 'tour'. The HiDES Help, (in this case Interpr.txt) is deliberately much more 'directed', and acts in the same way as a HiDES Historian's interpretation file in that it encourages the user to focus in on a particular episode (the British plan to disable the Belgrade-Salonika railway by blowing the Ibar Valley bridges) in the 'struggle between the Partisans and the Chetniks' and therefore advises study of a number of secondary works. This episode has been chosen because it allows a user to assess the role played by decisions made in London on the overall outcome of the Civil War. Both the Mimic (Tour files) and Interpretation Files have been written in such a way that they invite the user to exploit the entire range of evidence.

The 'resources' file normally remains resident on the screen at all times, to provide students with a complete catalogue of all relevant materials. It is useful to follow the course of an exploration. Students could follow from the 'mimic' files to search stills, moving images and videodisc sequences. In doing so they might well use the 'buttons' on the 'Resources' or Interpr.txt files, but it is more likely that they would wish to pursue

their enquiries regardless of the efforts of previous authors or users. Such searches might well use three other tools, the 'generic links' which were already authored, the 'show links' tool (icon on lower left of the screen) which allows a user to discover whether or not links have already been created using words in a given section of text, as well as a facility which acts as a full text retrieval system.

One such enquiry might well form a view of the *Chetniks*, using rare photos [as in figure 2; cf. also 3] which call attention to the extent to which the Chetnik forces were fired by loyalty to Orthodox traditions hewn in the villages of German-Occupied Serbia. Such photos as that of the swearing in service might well emerge from a search looking at *Chetniks*, then searching for links which refer to 'Orthodox'.
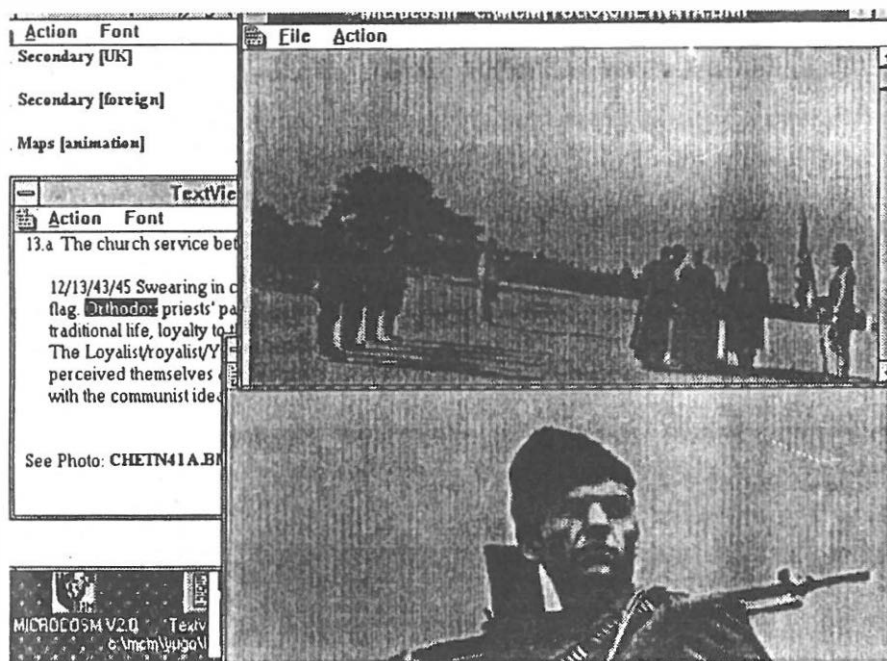

Figure 2: Screen dump 'Swearing in ceremony'

Such a search might well encourage a user to consult the HiDES ITS which urges users to write in their assessment of the various reports on the combatants, focusing on the extent to which Allied Liaison Officers commented on the extent to which religious factors influenced Partisan and Chetnik alike. In order to carry this out the ITS dialogue might well take a user through a careful study of these reports, emphasising the extent to which such documents could be read as attempts to influence the British and Allied Commands to a particular point of view. The students are able to move from their own notepad to consult the resources, or — as the dialog box indicates, reveal a series of links which might be explored — from the vantage offered by the 'caption text' which accompanies the photograph.
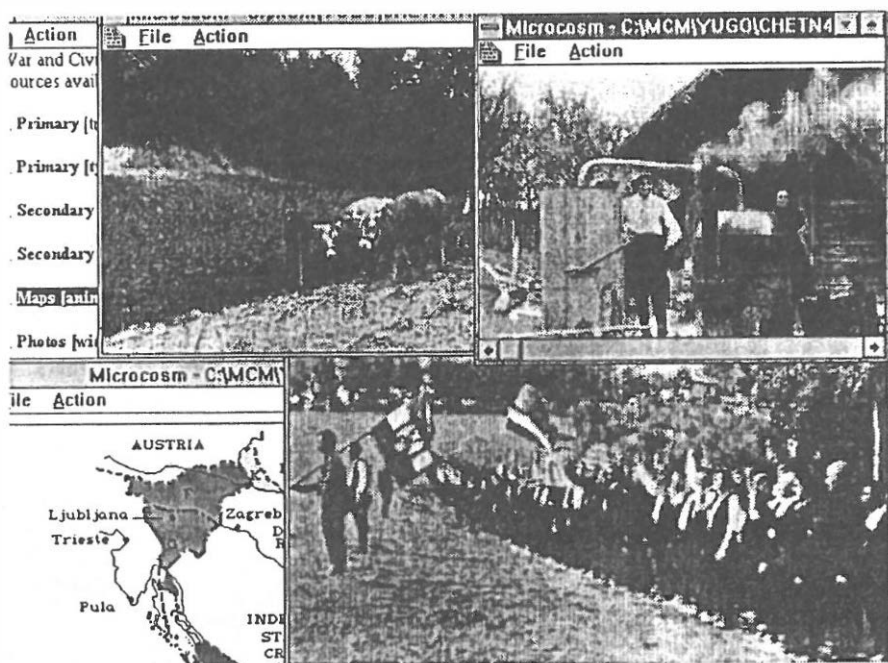

Figure 3: Screen dump 'Area and population'

One significant advantage of an ITS routine running under 'Microcosm' is the student's ability to retain various response files on screen and work from these files as well as the Notepad in order to develop an argument. In this case exploration of a source suggests that the Mansfield Report (one of the reports held in the archive) implies that the attempts of Allied strategists to spur Mihailovic and the considerable forces under his command to carry out large-scale sabotage activities against the German occupying forces might well put an intolerable strain upon the Yugoslav Army of the Homeland, which regarded itself as the sole legitimate defender of Serbian tradition awaiting the possibility of Allied invasion. The extent to which such forces could be regarded as 'collaborating' with the German army of occupation was to become a critical point for British and U.S. observers. The user might then search for the extent to which such 'collaboration' was cited in other texts held on the system. The fact that Maclean's report surfaces at the head of the list in the dialog box encourages a student to note its existence in the notepad, and consult the 'ITS'. The domain files indicate the extent to which the discussion of 'collaboration' should be understood in terms of the political and ethnic conflicts taking place at the time rather than through the 'larger context' provided by war between the Allies and the Axis Powers. This 'larger context' suffuses the language in the report of Fitzroy Maclean as well as that of the various policy documents discussing the strategy to be followed by the Allies in Yugoslavia. The 'resources' and 'interpretation' files are available for further consultation.

As might be expected the conflict between scholars owes much to the contradictory evidence provided by the reports of the Liaison officers, regarding the character and activities of General Mihailovic. A student might very properly be concerned to separate the historian's views of this controversial figure by isolating an author's use of the materials relating to Mihailovic from other documents available in the dataset. This has not previously been possible in a hypertext environment since the very selection of materials and links, automatically implies a degree of bias that might well be more clearly associated with a traditional publications, rather than a collection of materials which happen to be available in electronic form. It is our view that Microcosm-HiDES provides the means whereby a student can isolate and criticise 'authoring bias' inherent in the selection of images and text resident on the dataset.

The materials which have been selected for this package clearly reflect the arguments of its authors, and the extent to which they echo a particular strain in the continuing clash of interpretations between those who favour Lees' rather than Deakin's interpretation can be gauged in various ways. In first place a student can use the text-retrieval software to assess the extent to which the dataset contains documents derived from a variety of provenances. A rapid survey conducted by this means using keywords such as 'collaborator' provides a typical listing of primary printed sources central to the discussion of 'collaboration' and includes various official sources as well as Maclean's Report and the brief 'biographical note' on Mihailovic. A user could survey the wealth of materials using the text retrieval on a range of keywords or cluster of keywords, including references to various regions of Yugoslavia, key military and political figures.

A 'survey' of the electronic archive available on this system might well confirm the view that the sources for the dataset tend to be drawn from Chetnik sources: this is particularly

evident in the 'photographic data'. This reflects the wealth of materials available to argue the proposition that the Chetnik forces were drawn from the most traditional components of the population, especially from Christian Orthodox Serbia — a search for references to 'Orthodox' Christians indicates references in the many 'caption texts' which accompany the photographs. Even so the system also calls attention to the Mansfield Report of March 1944, one of the most comprehensive accounts of Mihailovic's activities.

While the survey of resources provides student users with a corrective against bias Microcosm also provides against the possibility that authors of the dataset might have established 'links' — a sure indication that one or another argument had been deployed. This, the 'second check for bias' allows the user to search for links which have already been written by the author of the dataset. The dialog box illustrates the result of a search for the links which might have been authored on Mihailovic. These include a photograph of Mihailovic, and various references to text files in which the controversial commander's activities are discussed, both by British and U.S. Liaison Officers. At the same time the user can look at secondary accounts of his activities, using excerpts from the works of writers such as Lees or Deakin which can be accessed through the 'resource' file.

Detecting 'bias' by examining a version of a text which has already been programmed into an application is extremely important. *Guide* a highly-recommended application may be criticised in that it uses 'embedded links' in a way which might disguise rather than highlight such bias. The section of Lees' account displayed in the Guide screen is such an illustration, Lees' clear bias in favour of Mihailovic's forces and their role in the Yugoslav Civil War stands out clearly not merely in the initial reference but in the 'headings' selected as prompts to further extracts. These should be compared to the 'clean' version available in the text files, and accessible through the 'resource file'.

The Yugoslav Civil War Teaching Dataset has been designed to allow students to exploit a wide range of data: current work with video and audio sources suggests that there is no reason why these should not be consulted in the same mode. While interpretative issues can never be excised from the materials to be presented, the software and data can be designed and setup in a way which allows them to isolate and identify several different forms of bias; compile their own collection, and (using the notepad) gradually create the 'electronic essay', using moving video sequences which merely represent samples of film as well as audio clips, to define and argue the merits of various interpretations of this first Yugoslav Civil War.

3. The authoring of a multimedia teaching package

The authoring of standard ITS packages has been described in the HiDES *Authoring Manual* currently in version 2. This takes an author through the 'feel and character of sources', the 'file structure', the use of applications and the programming of 'domain' files. HiDES have traditionally used one of four approaches to programming these files and may be summarized as 'debate', 'progressive argument', 'exposition' and 'reconstruction'.

While all four approaches may be used in a multimedia ITS dataset our initial experience suggests that the 'progressive argument' mode might be most effective in order to provide support for the user who is attempting to assess the scale of resources which are available within the system. This is because questions can be posed 'within the system'

which might allow a user to couple together the resources required to develop an argument using text, video, and audio sources.

The current experience of the Project suggests that 'Exposition mode', which encourages the user to complete an 'exercise' using an application or a mimic, can best be adopted for larger corpora primarily organized as an 'archive' rather than teaching dataset.

The 'Yugoslavia' package is much more than a mere 'collection of documents on the Yugoslav crisis' such as might be found in an archive. It is a corpora constructed with an interpretation in view, one which can certainly be questioned, and conceivably refuted, by any reader. Unlike a traditional book, with which it might be compared, the materials compiled on the system can be refashioned by users to their own ends. The author(s) of the package simply argue one interpretation as a heuristic device designed to signal the view that the roots of the crisis lie deep in the mentalities of the different ethnic groups of which that 'improbable survivor' was once comprised.

Naturally enough the issues posed by their interpretations have had to be faced fairly and squarely from the outset and they impinge at four different levels, in the selection of material, the programming of 'links', the choice of applications, and the programming of applications.

The advent of more powerful and effective scanning, screen and storage technologies has meant that authors could be far more catholic in their selection of materials than has previously been the case. Facsimile copies of original sources can be included where they are thought to be necessary, especially in text where the transcription of such materials into ASCII files of applications has involved an attempt to standardize orthography or in video where the use of 'micons' as 'visual abstracts' might have implied a choice on the part of the author. High CPU speeds and large discs also make a difference, since they allow for the storage of and retrieval of larger amounts of video data. It is at this point that authors selected the modes to be used in the presentation of visual and audio material. Digital storage implies that data can be incorporated with relative ease, analog storage (CD-ROM and Videodisc) provides a series of hurdles which have to be tackled in various ways. Our experience with early prototypes and the Mountbatten database suggested a combination of 'micons' and catalogues linked to the videodisc. Meanwhile audio materials were digitized and included as files.

The second stage of authoring involved the writing of 'specific' and generic links. Since specific links imply an interpretation of the materials, they should be used to provide files which allow the user to explore the corpora. They might therefore most effectively be used as 'resource' files, or as highlights in texts which are written by the author of the package and have been deliberately designed to indicate a given interpretation. 'Generic links' might often be used as a 'dictionary' facility, designed to provide access to glossaries, or prosopographical data, or even links with materials available on other applications. 'Tours' might be chosen as 'approaches' to the corpora. In the Yugoslavia dataset, the choice of 'links' implying a greater 'authorial' intervention in the debate indicates the extent to which accusations of 'collaboration' between Chetnik and German occupying forces might be viewed within a very specific context — that provided by the discussion between Special Operations Executive and the British Cabinet.

The third stage of authoring implies a choice of a specific application. To a certain extent these are dictated by the type of material within the corpora. A database management system (Superbase 4) was used as a means of housing a catalogue of the non-textual materials. At the same time powerful word-processing facilities were incorporated and provided users with the ability to store, explore and workup their data.

The choice of applications naturally implies a particular mode of interpretation. Databases can be used to manipulate substantial files and can be interrogated as part of an investigation of the corpus. In this context each application has to be accompanied by appropriate 'help' or 'interpretation' files, written by the author of the corpus.

The final stage of authoring entails applications programming to provide 'exercises' or 'assistance' to the user. Though the ITS has been developed primarily as an historians' tool, *Guide*, *Toolbook* and *Authorware* could also be used for this purpose.

Our experience suggests that such applications should not 'steer' the student too directly, but should point up failure to consult a given type of source. They should also be programmed in such a way that the materials in the package could therefore furnish weight to new interpretations, supported from a weight of evidence which could not previously have been placed within the student's grasp.

Microcosm and HiDES ITS provide a means by which students' might be stimulated to 'read' images, and begin to distinguish the extent to which they might have been manipulated by Chetnik and Partisan alike. For in understanding such manipulation students may be led to question existing interpretations of events such as the First Yugoslav Civil War.

Manfred Thaller (Ed.)

Images and Manuscripts
in Historical Computing

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Introduction

Manfred Thaller

This book is the product of a workshop held at the International University Institute in Firenze on November 15th, 1991. The intention of that workshop has been to bring together people from as many different approaches to "image processing" as possible. The reason for this "collecting" approach to the subject was a feeling, that while image processing in many ways has been the "hottest" topic in Humanities computing in recent years, it may be the least well defined. It seems also much harder to say in this area, what is specifically important to historians, than to other people. In that situation it was felt, that a forum would be helpful, which could sort out what of the various approaches can be useful in historical research.

To solve this task, the present volume has been produced: in many ways, it reflects the discussions which actually have been going on less, than the two companion volumes on the workshops at Glasgow and Tromsø do. This is intentional. On the one hand, the participants at the workshop in Firenze did strongly feel the need to have projects represented in the volume, which were not actually present at the workshop. On the other, the discussions for quite some time were engaged in clarifying what the *methodological* issues were. That is: what actually are the topics for scholarly discussion beyond the description of individual projects, when it comes to the processing of images in historical research?

The situation in the area is made difficult, because some of the underlying assumptions are connected with vigorous research groups, who use fora of scholarly debate, which are only slightly overlapping; so, what is tacitly assumed to hold true in one group of research projects may be considered so obviously wrong in another one, that it scarcely deserves explicit refutation.

We hope, that we have been successful in bringing some of these hidden differences in opinion out into the open. We consider this extremely important, because only that clarification allows for a fair evaluation of projects which may have started from different sets of assumption. So important, indeed, that we would like to catalogue here some of the basic differences of opinion which exist between image processing projects. The reader will rediscover them in many of the contributions; as editor I think however, that sumarizing them at the beginning may make the contributions — which, of course, have been striving for impartiality — more easily recognizable as parts of one coherent debate.

Three basic differences in opinion seem to exist today:

(1) Is image processing a genuine and independent field of computer based research in the Humanities, or is it an auxiliary tool? Many projects assume tacitly — and some do so quite outspokenly — that images on the computer act as illustrations to more conventional applications. To retrieval systems, as illustrations in catalogues and the like. Projects of this type tend to point out, that with currently easily available equipment and currently clearly understood data processing technologies, the analysis of images, which can quite easily be handled as illustrations today, is still costly and of uncertain promise. Which is the reason why they assume, that such analytical approaches, if at all, should be undertaken

as side effects of projects only, which focus upon the relatively simple administration of images. Their opponents think, in a nutshell, that while experiments may be needed, their overall outcome is so promising, that even the more simple techniques of today should be implemented only, if they can later be made useful for the advanced techniques now only partially feasible.

(2) Connected to this is another conflict, which might be the most constant one in Humanities data processing during the last decades, is particularly decisive, however, when it comes to image processing. Shall we concentrate on levels of sophistication, which are available for many on today's equipment or shall we try to make use of the most sophisticated tools today, trusting that they will become available to an increasingly large number of projects in the future? This specific battle has been fought since the earliest years of Humanities computing, and this editor has found himself on both sides at different stages. A "right" answer does not exist: the debate in image processing is probably one of the best occassions to understand mutually, that both positions are full of merit. It is pointless to take permanently restrictions into consideration, which obviously will cease to exist a few years from now. It discredits all of us, if computing in history always promises results only on next years equipment and does not deliver here and now. Maybe, that is indeed one of the more important tasks of the _Association for History and Computing_: to provide a link between both worlds, lending vision to those of us burdened down by the next funding deadline and disciplining the loftier projects by the question of when something will be affordable for all of us.

(3) The third major underlying difference is inherently connected to the previous ones. An image as such is beautiful, but not very useful, before it is connected to a description. Shall such descriptions be arbitrary, formulated in the traditionally clouded language of a historian, perfectly unsuitable for any sophisticated technique of retrieval, maybe not even unambigously understandable to a fellow historian? Or shall they follow a predefined catalogue of narrow criteria, using a carefully controlled vocabulary, for both of which it is somewhat unclear how they will remain relevant for future research questions which have not been asked so far? — All the contributors to this volume have been much to polite to phrase their opinions in this way: scarcely any of them does not have a strong one with regard to this problem.

More questions than answers. "Image processing", whether applied to images proper or to digitalized manuscripts, seems indeed to be an area, where many methodological questions remain open. Besides that, interestingly, it seems to be one of the most consequential ones: a project like the digitalization of the _Archivo General de Indias_ will continue to influence the conditions of historical work for decades in the next century. There are not only many open questions, it is worthwhile and neccessary to discuss them.

While everybody seems to have encountered image processing in one form or the other already, precise knowledge about it seems to be relatively scarce. The volume starts, therefore, with a general introduction into the field by J. v.d. Berg, H. Brandhorst and P. v. Huisstede. While most of the following contributions have been written to be as self supporting as possible, this introduction attempts to give all readers, particularly those

with only a vague notion of the techniques concerned, a common ground upon which the more specialized discussions may build.

The contributions that follow have been written to introduce specific areas, where handling of images is useful and can be integrated into a larger context. All authors have been asked in this part to clearly state their own opinion, to produce clearcut statements about their methodological position in the discussions described above. Originally, four contributions were planned: the first one, discussing whether the more advanced techniques of image processing can change the way in which images are analysed and handled by art historians, could unfortunately not be included in this volume due to printing deadlines: we hope to present it as part of follow up volumes or in one of the next issues of _History and Computing._

The paper of M. Thaller argues that scanning and presenting corpora of manuscripts on a work station can (a) save the originals, (b) introduce new methods for palaeographic training into university teaching, (c) provide tools for reading damaged manuscripts, the comparison of hand writing and general palaeographic studies. He further proposes to build upon that a new understanding of editorial work. A fairly long technical discussion of the mechanisms needed to link images and transcriptions of manuscripts in a wider context follows.

F. Colson and W. Hall discuss the role of images in teaching systems in university education. They do so by a detailed description of the mechanism by which images are integrated into Microcosm / HiDES teaching packages. Their considerations include the treatment of moving images; furthermore they enquire about relationships between image and text in typical stages in the dialogue between a teaching package and a user.

W. Hall and F. Colson argue in the final contribution to this part the general case of open systems, exemplifying their argument with a discussion of the various degrees in which control about the choices a user has is ascertained in the ways in which navigation is supported in a hyper-text oriented system containing images. In a nutshell the difference between "open" and closed systems can be understood as the following: in an "open system" the user can dynamically develop further the behaviour of an image-based or image-related system. On the contrary in static "editions" the editor has absolute control, the user none.

Following these general description of approaches, in the third part, several international projects are presented, which describe in detail the decisions taken in implementing "real" image processing based applications, some of them of almost frigthening magnitude. The contributors of this part were asked to provide a different kind of introduction to the subject than those to the previous two: all of them should discuss a relatively small topic, which, however, should be discussed with much greater detail than the relatively broad overviews of the first two parts.

All the contributions growing out of the workshop came from projects, which had among their aims the immediate applicability of the tools developed within the next 12 - 24 months. As a result they are focusing on corpora not much beyond 20.000 (color) and 100.000 (b/w) images, which are supposed to be stored in resolutions manageable within ≤ 5 MB / image (color) and ≤ 0.5 MB / image (b/w). The participants of the workshop felt strongly, that this view should be augmented by a description of the rationale behind

the creation of a large scale project for the systematic conversion of a complete archive. The resulting paper, by P. González, describes the considerations which lead to the design of the *Archivo General de Indias* project and the experiences gained during the completed stages. That description is enhanced by a discussion of the strategies selected to make the raw bitmaps accessible via suitable descriptions / transcriptions / keywords. A critical appraisal, which decisions would be made differently after the developments in hardware technology in recent years, augments the value of the description.

The participants of the workshop felt furthermore strongly, that their view described above should be augmented by a description of the techniques used for the handling of images in extremely high resolution. A. Hamber's contribution, dealing with the *Vasari project*, gives a very thorough introduction into the technical problems encountered in handling images of extremely high quality and also explains the economic rationale behind an approach to start on purpose with the highest quality of images available today on prototypical hardware.

As these huge projects both were related to institutions which traditionally collect source material for historical studies, it seemed wise to include also a view on the role images would play in the data archives which traditionally have been of much importance in the considerations of the AHC. E.S. Ore discusses what implications this type of machine readable material should have for the infrastructure of institutions specifically dedicated to Humanities computing.

Image systems which deal with the archiving of pictorial material and manuscript systems have so far generally fairly "shallow" descriptions. At least in art history, moreover, the rely quite frequently on pre-defined terminologies. G. Jaritz and B. Schuh describe how far and why historical research needs a different approach to grasp as much of the internal structure and the content of an image as possible.

Last not least R. Rowland, who acted as host of the workshop at Firenze, describes the considerations which currently prepare the creation of another largescale archival database, to contain large amounts of material from the archives of the inquisition in Portugal. His contribution tries to explore the way in which the more recent developments of image processing can be embedded in the general services required for an archival system.

This series of workshop reports shall attempt to provide a broader basis for thorough discussions of current methodological questions. Their main virtue shall be, that it is produced sufficiently quick to become available, before developments in this field of extremely quick development make them obsolete. We hope we have reached that goal: the editor has to apologize, however, that due to the necessity to bring this volume out in time, proofreading has by neccessity be not as intensive as it should have been. To which another shortcoming is added: none of the persons engaged in the final production of this volume is a native speaker of English; so while we hope to have kept to the standards of what might be described as "International" or "Continental" English, the native speakers among the readers can only be asked for their tolerance.

Göttingen, August 1992