Servicing the State: Municipality and the Military Industrial Complex

Richard Brook, Lancaster University

Abstract
Following its charter of 1956, the Manchester Municipal College of Technology appointed a new principal, who oversaw the rapid expansion of the campus. The development of a suite of new buildings, on one of the city's most polluted and derelict tracts, required cooperation between the College, the Victoria University of Manchester, the Manchester Corporation, and a host of central government ministries. This initiative was driven by the recognition that technology and technological education were vital tools in the retention of Britain's global influence. Manchester was identified for the accelerated growth of higher technological education due to its history of engineering, manufacturing and the development of commercial computing. Founded on archival sources, this article explores the complex relationships between statecraft, Whitehall policy, municipal governance and space. Using the manifestation of urban planning and architecture, it argues that the 'Warfare State' had influence beyond overt military programmes, which informed certain civic and municipal local enterprise with objectives other than rearmament, such as education, employment and economic recovery.

Keywords: UMIST; urban renewal; post-war; planning; architecture; university

---

Post-war Britain demanded new technological education. Manchester was an obvious choice, owing to its industrial manufacturing history, and the clustering of computing and nuclear research and development in the north-west of the United Kingdom. In this article, I argue that David Edgerton's conception of the 'Warfare State' can be extended beyond its explicit military context, and that the existential threat of a Cold War was, in this case, leveraged by regional and municipal actors in pursuit of technological, economic and educational advancements.[1] I suggest that such development serviced central government agendas, but also satisfied local demands for growth in a post-industrial economy that languished in the face of globalisation, decolonisation, the economic downturn of the 1930s and the slow recovery, particularly in the North, in the immediate post-war years. The expansion of Manchester's College of Science and Technology was bound with rearmament and tied to a regional cluster of military industrial research, but was also intrinsic to the desires of local business and the local authority to enact urban renewal at a large scale. The major phases of its development, from 1957 to 1970, ran in tandem with the reconstruction of large parts of the city, and together they signalled economic recovery worthy of further investment by government and the private sector.

Atomic warfare was a powerful force shaping the government agenda in the late 1940s.[2] The political elite, in the face of diminishing global power, wanted to restate Britain's international authority. In the United States, the McMahon Act of 1946 denied Britain any further collaborative role in the development of the atomic bomb. The first

controlled nuclear explosion by the Soviet Union in 1949, and the outbreak of war in Korea in 1950, made the rearmament programme and civil defence central to government activity. Welfare expenditure shrank and defence spending grew, feeding the 'Warfare State'. In the United Kingdom, civil and defence applications were interwoven – relationships that were underpinned by personnel who held military positions during wartime and parliamentary posts in the post-war period.

Earlier, in 1944, Ernest Bevin, Minister of Labour in the wartime cabinet, had brought attention to the lack of technically skilled workers. This was underlined by a series of reports, that considered the demand for retraining scientific workers, and the role of colleges and universities in this provision.[3] The Hankey committee (1945) 'identified the extent of Britain's (re)training needs'; the Percy committee (1945) looked at higher technological education; and the Barlow committee (1946) examined the demand for educated workers in the future.[4] Collectively, the outcome was a recommendation for a significant increase in student numbers, particularly in technological education. The Percy Report made the distinction between the provision of technological education in universities and colleges.[5] It also established the need for technical colleges to underpin the immediate expansion, since the universities were not then in a position to do so.[6] Technical colleges needed investment, and it was this dual purpose of expansion and improvement that drove the initiative for the first wave of new colleges of technology, amongst which was Manchester.

Networks

Defence and military research during the war, by Allied and German scientists alike, advanced knowledge for the technologies that would define the global political landscape for the rest of the twentieth century and beyond: the nuclear bomb, the rocket and the computer. Whilst directed from Whitehall, it was the regional military industrial structures that influenced the focus of nuclear and computing cultures in the north-west of England. The geography of regionally clustered nuclear research and development was a product of war. From as early as 1935, Cabinet had discussed the flight range of Luftwaffe bombers and the location of munitions factories.[7] Sites in the north-west were preferred owing to their distance from mainland Europe. Of the forty-four Royal Ordnance factories, nineteen were retained after 1945 for the peacetime production of arms, including the nuclear programme.[8] For atomic production facilities, 'a certain separation from centres of population had to be balanced against the accessibility of local labour. Within these constraints it was the proximity of industrial and academic organisations … that led to the selection of North West England as the key location.'[9] These industrial and academic organisations were already collaborating on various aspects of research and development necessary to realise the delivery of a nuclear missile – the earliest uranium enrichment occurred at Rhydymwyn in North Wales, where Metropolitan Vickers (who also operated a large facility in Manchester) worked with Imperial Chemical Industries; pioneering nuclear research was undertaken jointly by the University of Manchester and the United Kingdom Atomic Energy Authority (UKAEA) at Risley near Warrington; guided missiles were developed by Ferranti in Wythenshawe; and an array of defence contracts were awarded to companies in the north-west, most notably at sites at Warton and Samlesbury near Preston, operated by

English Electric (later British Aerospace).[10] Instrumental in the development of rockets and the nuclear programme was the computer. Manchester was one of three British centres where the earliest computing research was carried out, in this case by a group of scientists already known to one another from their wartime occupations.[11] Amongst them was Bertram Vivian Bowden, who was 42 years old and leading the computer sales division at Ferranti when he was appointed as Principal of the Manchester Municipal College of Technology (hereafter referred to as 'the College' and later, from 1966, known as the University of Manchester Institute of Science and Technology (UMIST)) in 1953.[12]

During the war, Bowden had been posted to Washington DC and the Massachusetts Institute of Technology (MIT) to work on the development of the radar. He led a British team in his role as principal scientific advisor to the Ministry of Supply's Telecommunications Research Establishment, where he worked with Freddie Williams, Tom Kilburn and Peter Hall.[13] On his return to the United Kingdom, Bowden joined the UKAEA.[14] His experience of military technological research in well-funded higher education institutions was a dramatic influence and shaped his collaborative approach in the future, including his stewardship of technological education in Manchester. Freddie Williams and his assistant Kilburn were electronic engineers, who found themselves rapidly without purpose in August 1945 as hostilities ended.[15] They gravitated towards the University of Manchester, where the Cambridge mathematician Max Newman had taken a post as Professor of Pure Mathematics in 1945. Following encouragement from Patrick Blackett, Williams was appointed by Newman as Chair of Electrical Engineering in November 1946, and Kilburn was 'on loan' from the Ministry of Supply.[16] By June 1948, the assembled group of mathematicians and electrical engineers achieved a global first in realising the 'stored program' computing principle, in the machine now popularly known as 'Baby'.[17] In October 1948, the Ministry of Supply asked Ferranti to help to build a computer, to designs by the group, funded by the Ministry of Defence and given technical support from the Telecommunications Research Establishment.[18] Shortly afterwards, Bowden and Hall took positions with Ferranti, also in Manchester.

Bowden's experience in the United States, combined with his personal proximity to technological research and development in Manchester, led to his appointment as principal. His advocacy for the development of the College was not far short of propaganda, a tactic in which he was well versed; in his introduction to an edited volume on British computer research, *Faster than Thought* (1953), a potted history helped to fix the narrative of Manchester as its birthplace. By 1956, in typically bombastic prose, he had penned his *Proposals for the Development of the Manchester College of Science and Technology*, asserting that '[t]he college will perform a vitally important service for the industry of the country as a whole and of this district in particular'.[19]

The College of Science and Technology

The origins of the College can be traced back to the foundation of the Manchester Mechanics Institute, in 1824, in the Bridgewater public house. In 1902, the Institute relocated to a new home on Sackville Street, designed for them by Spalding and Cross, and latterly extended to designs by Bradshaw, Gass and Hope (1927–57). The Institute became the School of Technology (1902) and later the Municipal College of Technology (1918). The College gained its own charter in 1956, leading to an increased focus on degree-level academic courses (it was not until 1966 that the name UMIST was adopted). The College makes for an interesting case study for several reasons, most obviously its transition from locally resourced further education college to a nationally funded higher education facility. It was one of the first institutions to make such a move, and its development predated the wider post-war expansion programme for British universities. The processes for the rapid approval and funding of construction at the College helped the University Grants Committee to refine their policies and budgets as the rate of expansion in the sector accelerated.

Furthermore, the site dedicated for the growth of the institution, combined with Manchester's post-war plans, entangled it with the ambitions of the Corporation – its southern edge was bounded by a proposed aerial motorway that cut a swathe through existing, but condemned, dense terraced housing. As well as its position in the interplay of tiers of governance, the development of the campus was a collaborative exercise, where the Planning and Development Committee arrived at a consensus view that informed architectural decisions. In the ten years between 1959 and 1969, thirteen new buildings were realised on the complicated inner-city site, their design distributed between three local architectural practices. The ensuing suite of predominantly white concrete buildings, set amidst the lawns of a well-organised campus, whilst arguably mainstream, are broadly considered as a group to be amongst the best of the post-war campuses in the United Kingdom.[20]

Manchester's College, with Imperial College London, was one of the first significant investments in the expansion of higher education after 1945. Its growth does not align with the established architectural histories of university development in the United Kingdom, however; it was not 'ancient', 'redbrick' or 'plate-glass'.[21] The idiosyncratic situation of the institution lies in its creation, and the prevailing British attitude towards higher technical education. Historically, the College made an unusual provision for both further and higher education in science and technology subjects. Since 1905, a concordat with the University of Manchester had underwritten the awarding of higher degrees.[22] The College itself retained its funding structure from the Ministry of Education and the Manchester Corporation, whereas universities were independent, with their sole source of State funding coming from the University Grants Committee and, in varying degrees, controlled by the Treasury.[23] As early as 1936, and perhaps pre-empting the post-war organisational demands, the Manchester Corporation realised that logistical planning at a regional scale was required to 'organise a more rational use of equipment' (at the College), and to transfer less specialist courses to other local institutions.[24]

The local understanding of the regional, if not national, importance of the College was reinforced in the years following 1945, and, as the extension to the Sackville Street building neared completion in the mid-1950s, discussions between the University of Manchester, the City of Manchester Education Committee and the University Grants Committee were underway as to how best to develop the institution.[25] Part of this preparation involved the construction of new technical colleges by the Manchester Corporation, which would divert some of the more vocational courses away from the College and thus permit a greater focus on higher technological education at the inner-city site.[26]

The University Grants Committee was historically able to 'propagate without interference' from the Treasury and the Board of Education, and, until 1939, it was the universities that set the ideological tone within which their development took place.[27] At this time, the accepted consensus was that the State should be the 'subordinate partner' in this relationship.[28] The outbreak of war changed this situation, however, as buildings were requisitioned for alternative purposes, young men were enlisted, and institutions were evacuated in their entirety. The study of science was subject to particular intervention 'directly related to the various and developing needs of the war machine'.[29] The legacy of this type of direct instruction from the State, combined with the numerous reports produced in the mid-1940s that examined the educational needs of a range of professions, was a strengthening of the University Grants Committee's 'machinery'.[30] Nevertheless, the College was in a position to inform the policy and cost yardsticks of the University Grants Committee as it developed new and unique building types and was in advance of other university construction. Effectively, a generous budget was available to the College if it was able to justify its demands. Due in part to the lack of input from the Ministry of Education, the unprecedented new technological institutions had much more control of their own planning and building programmes than the plate-glass universities that would follow.

As well as recommending expansion in science and technological higher education, the Barlow Report, referring to the demand for educated workers, proposed that certain existing university colleges should become universities in their own right, and that a number of institutes of technology should be established. It advocated for the increased involvement of the University Grants Committee in planning for the development of the universities, and proposed that at least one new university was founded.[31] These factors, and the extant situation of the College in an industrial city with a history of innovation already delivering higher education courses, combined to make Manchester a prominent candidate for investment. Even so, despite the recommendations, the Labour government was slow to act, and did not consolidate its views until its 1951 pre-election statement in *Higher Technological Education*.[32] Labour lost the general election, but the case for expansion was clear, and the incoming Conservative administration had to address demand. Their policy response was not implemented until the White Paper on Technical Education (1956). In the meantime, necessity being the mother of invention, the plans for the College, its transition to exclusively Higher Education provision, and its full charter as a university, progressed, despite there being no agreed national framework.[33]

Reflective of the focus upon defence and rearmament in the region, in 1953–54 Manchester was in receipt of a greater proportion of central government funding for technical education than any other provincial city.[34] The grant of a Royal Charter to the College was publicly announced in March 1954 by the Conservative Party chairman, Lord Woolton, on a visit to Manchester, and endorsed by the city's Education Committee.[35] It was formally announced in the House of Commons on 1 August 1955, and one year later, the new governing body took control of the institution, replacing the Education Committee of the City Council who had been administrative guardians since 1892.[36] Bowden's description of the negotiations implies a degree of trust between central and local government; that each would adhere to implicit agreements concerning sources of funding for various acts of land assembly and purchase. This sentiment was mirrored by Rab Butler, Leader of the House of Commons (famously known for his promotion of political consensus in the post-war period), who described the Manchester Corporation as having 'shown the utmost forward-looking patriotism … to reserve an area of seventeen and a half acres for the development'.[37]

Following the royal assent of the Manchester Corporation Act, the transfer of the College was formalised. The new campus was to be built to the south of the Manchester South Junction and Altrincham railway viaduct. Thus, with the original College buildings to its north, efforts to unify the campus either side of the brick mass that cut a divisive east–west transect across the site were ambitious and complicated. Further design and construction challenges were encountered as the proposed site extended into Chorlton-upon-Medlock, an area that was one of the oldest industrial sectors of the city. The dark curves of the polluted River Medlock wound their way through the allotted land, and carved through the railway viaduct. The culverting and rerouting of the river was key to releasing the land, and initial plans envisioned exclusively new buildings on the site. The new aerial motorway, initially known as 'Link Road 17/7', would form the southernmost boundary. The Manchester Corporation Bill of 1957 was designed to achieve the major objectives of permission for the alignment of the road and the culverting of the River Medlock, both of which had a bearing on the plans for the College, but equally could be achieved independently. The cost of culverting the River Medlock was eventually shared between the local authority and the University Grants Committee.[38] In this instance, we can see the relations between local and national government that the planning historian Gordon Cherry reconciled as a dual system of 'shared responsibilities', and which John Davis explained as expanding the activities of local government whilst increasingly determining their financing.[39] It was the conflicts of the twentieth century that created the dispersed regional offices of government departments with devolved powers, yet increasingly, in the post-war period as peacetime advanced, local government was in direct communication with Whitehall, rather than relying on regional offices as a conduit. Thus, some of the powers invested in the regional ministerial offices were diminished, and local government responsibilities intensified.

The interrelationship of the various actors was further highlighted by delays in the approval of the Bill that followed in 1958. Its slow passage through Parliament had a direct impact on the construction schedule. This in turn required an 'exceptional' transfer of funds from one year's programme into another by the University Grants

Committee. [40] As building projects were delayed, costs began to rise, placing phasing possibilities at odds with funding streams.[41] The University Grants Committee did not wish to be consulted on the design of buildings until the schemes reached a particular submission status, when proposed buildings could be costed in relation to other buildings of a similar type.[42] This was problematic in terms of the first major building on site, the lecture room block, since it was a 'new departure in educational building' and seen as risky to significantly develop without consultation.[43] It also meant that any plans for a phased sequence of development were routinely disrupted. As the University Grants Committee gained experience, costs would become much tighter, but in 1957 there was no indication that they would apply standardisation to the building models and subsequent expenditure on the Manchester campus. Indeed, any 'unimaginative cheeseparing' was deemed 'undesirable' if it limited the quality of new buildings.[44]

Generally, the University Grants Committee viewed the College's committee structures favourably, and valued their advice in design and procurement protocols.[45] The building programme itself was under constant adjustment, in line with parliamentary decisions that impacted upon the work of the University Grants Committee and ultimately the development of the College, where the content and organisation of the master plan was subject to both national advice and local interpretation. Indicative of its special status, and of the urgency for its services, the College secured an annual review of its construction budget, and was not subject to the quinquennial system applied elsewhere.[46]

Bowden was concerned with the site organisation in terms of its open space. His was a vision where buildings should 'be sited with dignity and propriety, and in such a way that the sun and air can penetrate the buildings and the spaces between them'.[47] Aligned with Bowden's view, and accounting for the overall appearance of the development, the Planning and Development Committee prepared a design-briefing document entitled 'Some Canons of Good Design'.[48] In a manner befitting a technological institution, the functional demands of spaces were assumed as the primary organising factor in the design of buildings. Their aesthetic treatment was also a concern, however, and was referred to under the banner of 'pleasing appearance'. This short treatise extended to the massing and proportion of new buildings, a tacit instruction as to the honesty of facades and to a simplicity informed by economy, lack of 'fuss', and the use of modern materials that would not deteriorate with age in the Manchester climate. The University of Manchester developed a range of 'neo-Georgian' buildings during the 1950s in a similar and unified style, designed by H. S. Fairhurst & Sons, on Brunswick Street, broadly aligned with the beaux-arts vision of Worthington's plan in 1945.[49] The architectural qualities of the Brunswick Street ensemble were unpopular with certain politicians; the visual appearance of the new buildings was regarded as insufficiently progressive, which may have influenced the directive for honesty and simplicity in the College buildings. A further clause stipulated that 'the use of modern materials, constructions and techniques is desirable', but also that 'they must have a raison d'etre [*sic*] other than a mere exercise in technological ingenuity'.[50]

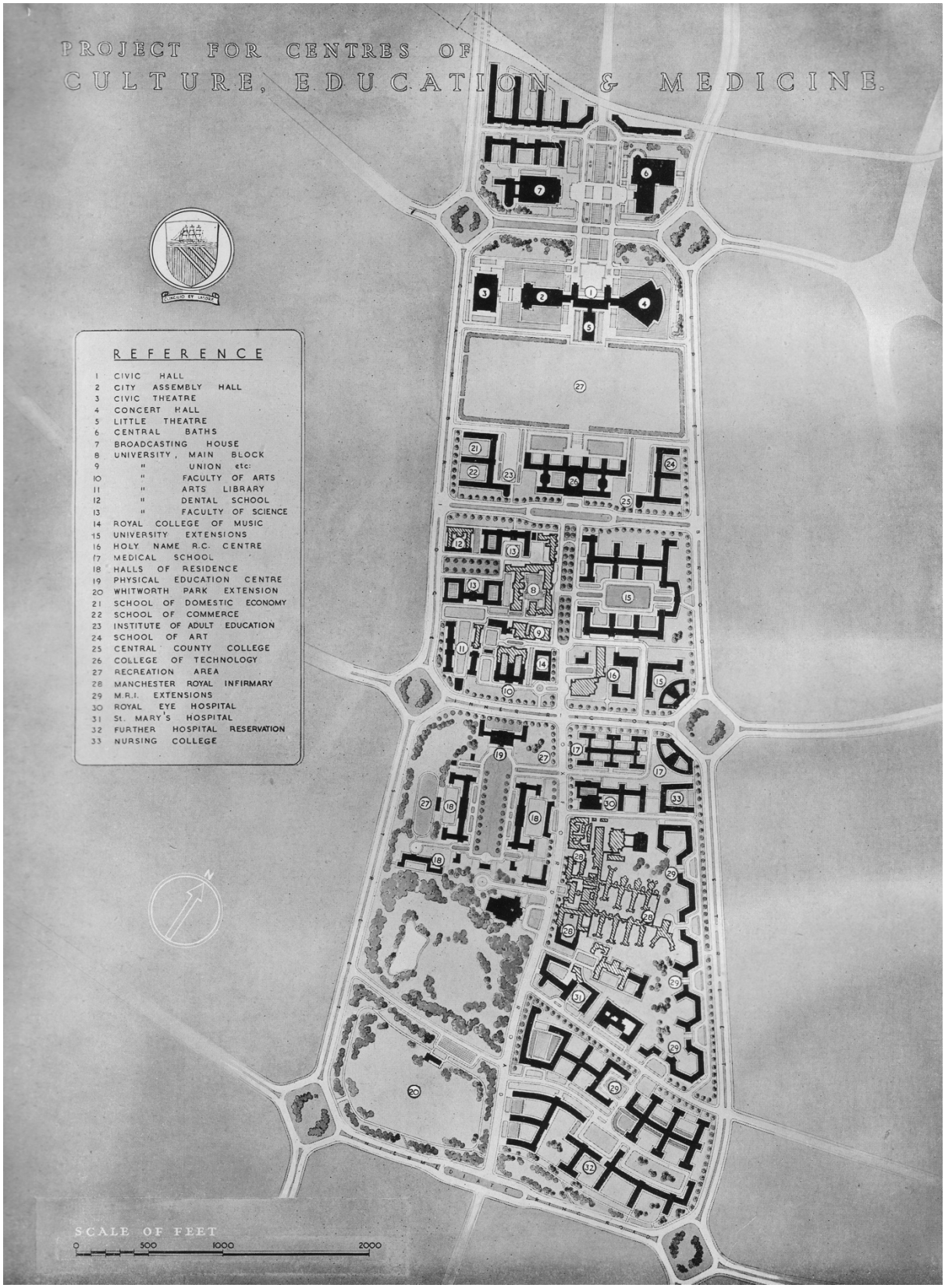

Fig. 1. Hubert Worthington's plan for the Centre of Education, Culture and Medicine from Manchester's 1945 Plan. The strong axial and symmetrical planning was used to organise the buildings of the 1950s and 1960s along Brunswick Street (labelled '15' on the plan). Nicholas, R. (1945) City of Manchester Plan, Plate 30. Reproduced courtesy of Manchester Archives+.

Sir Hubert Worthington was appointed as the site architect in July 1955. The son of accomplished Victorian architect Thomas Worthington, he had spent some time training in Edwin Lutyens's office before the First World War, and was Professor of Architecture at the Royal College of Art and Slade Lecturer at Oxford.[51] He was responsible for the planning of the 'Educational Centre' component of City Surveyor and Engineer Rowland Nicholas's radically ambitious *City of Manchester Plan, 1945* (**Figure 1**), and designed several university buildings including the Arts Library (1937), Dental School (1940) and Museum extension (1952) for the University of Manchester, as well as an extension to the Radcliffe Science Library (1933–34) and buildings for Merton College (1940) and the Department of Botany (1952) at Oxford University.[52] It was proposed that Worthington would be joined by 'two or three Project Architects, every project for a building to be given to one or other member of the panel'.[53] The other appointed firms were H. S. Fairhurst & Sons, and Cruickshank & Seward.[54]

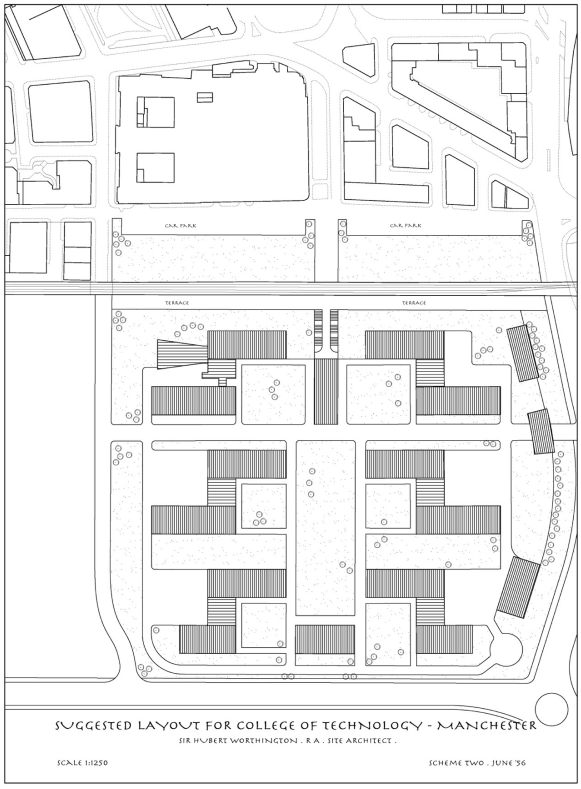

Fig. 2. Scheme Two. Suggested Layout for College of Technology from the office of Hubert Worthington, June 1956. The axial and symmetrical planning is reflective of the type employed by Worthington for the Centre of Education, Culture and Medicine in 1945, and for early iterations of his collaborative work at Imperial College, London. Redrawn by author based on drawing in the Minutes of the Planning and Development Committee (Manchester, University of Manchester Archives, TGB/2/5/1).

Representatives from all three practices were regularly in attendance at the Planning and Development Committee meetings of the institute, where the Corporation's interests were fostered by various parties including the powerful Rowland Nicholas. This association of the Mancunian architectural establishment of the day was extremely significant, and was perhaps one of the reasons for the considerable strength of the masterplan and the capacity to carve out a campus from the carcass of a knotted

and crumbling part of the city. The architects held discussions with one another about their respective projects within the context of the broader vision. The production of the masterplans (**Figures 2** and **3**) continued through 1960 and 1961, but without any new contribution by Worthington's office, as Arthur Gibbon of Cruickshank & Seward asserted his authority and capitalised on a burgeoning friendship with Bowden; Gibbon saw Bowden as his patron, having been previously associated through his scheme for a missile factory in Wythenshawe for Ferranti. As site architects, Worthington's drawings simply reflected the detailed design work undertaken by the other two firms. It was important to keep the master plan up to date, since it accompanied the 'unusual' annual submissions to the University Grants Committee. As the dynamic masterplanning ran alongside the design of the buildings to populate it, form and appearance were decisions reached by consensus.

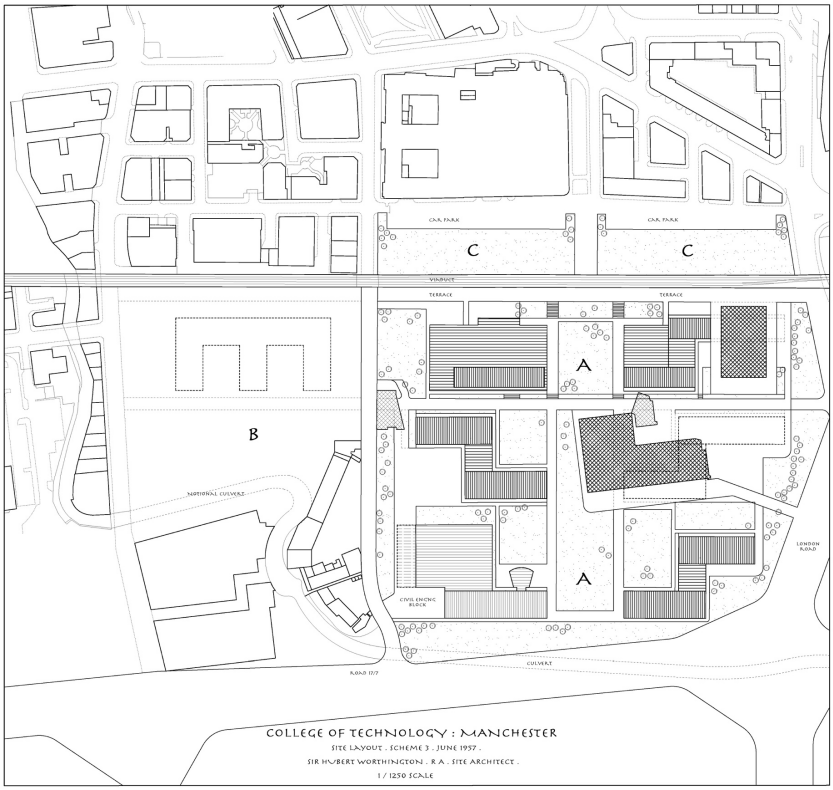

Fig. 3. Scheme Three. Here is seen the decision to retain the existing mill building at the centre of the site and the emergence of the quads based on its retention. The tower and podium of the Renold Building (top left) reflects the need to site the tower element as far away from the noise of the railway as possible. Redrawn by author based on drawing in the Minutes of the Planning and Development Committee (Manchester, University of Manchester Archives, TGB/2/5/1).

The first such agreement hinged upon the retention of Jackson Street Mill in the centre of the campus. The mid-nineteenth-century mill had been substantially remodelled in 1903, following a fire two years earlier. It was already in use by the College and its floor area was roughly equivalent to that required by the rapidly growing departments. Delays to the Manchester Corporation Bill meant that funds from the University Grants Committee were reallocated to protect the College building programme for 1959.[55] In

quick and decisive mode, it was acknowledged that a small addition to the mill was the only construction project that could be achieved within the allotted period and for the designated sum.[56] Retaining the mill redefined the proportions of the open spaces envisaged in Worthington's early plans. The small extension was considered to 'form a more satisfactory southern boundary to the second court'.[57] It consolidated a series of implied squares, and created stronger orthogonal boundaries. Its development was viewed as an important element of the overall master plan, and it can be seen in Scheme 5 **(Figure 4**) adjoining the mill in the centre of the plan. The plan form of 'Staff House building with cloister and concourse' was intended to complete the two self-contained quads.[58] Here is the traditional language of an Oxbridge College – the cloister and quad – in combination with the development of contemporary modern architecture. It might be argued that the 'Some canons' document was a dilution of modernism to produce acceptable mainstream architecture; Staff House was the first new building to be completed on the campus, and could well fit this classification. Nevertheless, the College pioneered new and unique building types, including Europe's first lecture room block, one of the United Kingdom's first purpose-built halls of residence that used a prefabricated system, and a chemical engineering lab with a strong functional bias, putting its exposed pipes and wires on display. Emblematic of their novelty, the cost control exerted on the plate-glass universities of the 1960s was developed through the analysis of these prototypes in Manchester.

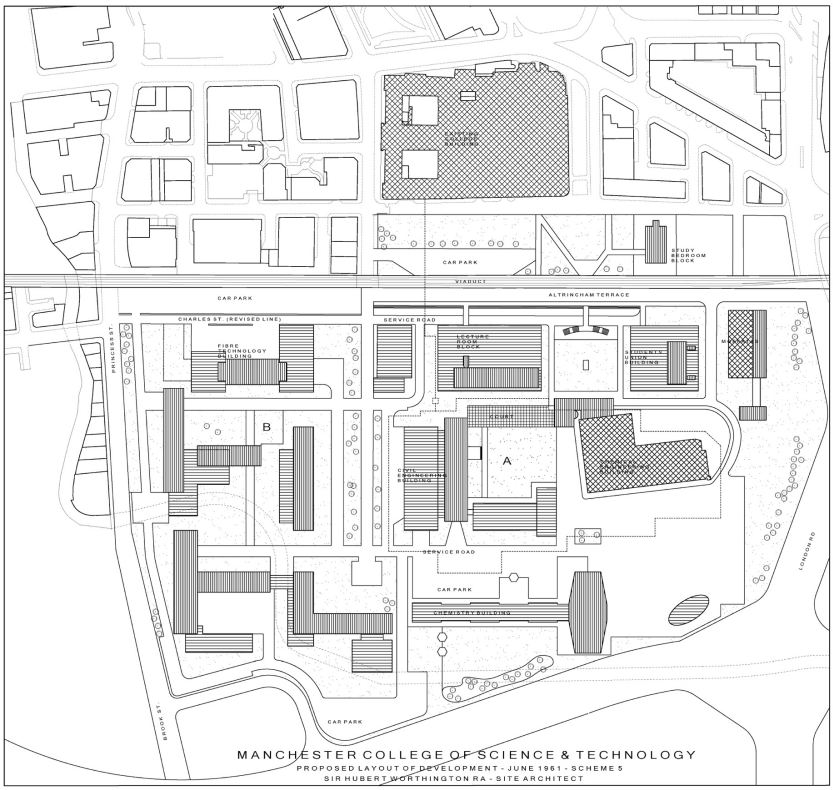

Fig 4 Scheme Five. This drawing shows the increasingly fixed forms of the Lecture Room Block (Renold Building), Students Union Building (Barnes Wallis) and Civil Engineering Building (Pariser Building). The addition of Staff House to the mill is also shown, and formalises the southern edge of the most northerly quad. Redrawn by author based on drawing in the Minutes of the Planning and Development Committee (Manchester, University of Manchester Archives, TGB/2/5/1).

Following Hubert Worthington's death in 1963, Gibbon took control of the masterplan. Worthington's passing prompted the Planning and Development Committee to note his intentions in relation to the campus organisation. The separation of pedestrians and service vehicles by means of an 'outer ring', the planning of an interconnected series of squares, and the site layout as the 'agent' to unite the buildings into a cohesive campus were the three guiding principles. This was evidently an evolution from the earliest ideas, and was exemplar of both the consensus view and the motion away from axial planning to something more modular. The masterplan for the campus created a modern urban park from the ad hoc urban-industrial grain that had grown up around the river. Whilst adopting the use of the word 'quad' when describing external spaces, these were not the enclosed courts of Oxford colleges, but rather open lawns accessible to the citizenry. The campus was a new modern imposition, as if a clean slate, delimited by existing and proposed infrastructure. Its design did not take account of the existing grain of the streets, but instead sought to address the new and to adjust the existing to suit. The progressive sweep included the reordering of nature, as the river was diverted into an engineered culvert, literally and metaphorically moulding the city through concrete pours and assemblies. The series of towers defined the new formal logic of the site. Gibbon was responsible for the design of four of these, and the siting of the fifth. Most of the architectural precedent for the new buildings came from continental Europe, but the precedent for campus planning was more closely tied to the United States.

In the architectural journals of the early 1950s that were accessible in Manchester, most published articles about university buildings were from the United States. The architects for the College must have been aware of the expansion and master plans in US institutions. In spirit, if not in scale, it is William Wurster's campus plans for the University of California, Berkeley (1951, 1955 and 1956) that can be compared to the College.[59] Wurster was Dean of the School of Architecture and Planning at MIT between 1944 and 1949, before assuming the equivalent post in California. He corresponded regularly with the Finnish architect Alvar Aalto, who was a proponent of more organic forms of modernism, and who described his own work as 'between Humanism and Materialism'.[60] Wurster was responsible for Aalto's appointment as professor at MIT, and for the subsequent commission of the Baker House dormitory block.[61] In his final year as Dean of MIT, Wurster delivered a talk about 'architecture as social art'.[62] It is this central concept that can be seen to underpin the 'utopianist' ideas of the various international post-war higher education programmes.[63] For Bowden, as well as connecting research to industry, the life of the students and their proximity to both study and amenity was crucial in his conception of a university. Like the College, Berkeley had to expand into adjacent urban fabric. Each institution protected its character from over-development, despite land premiums, by the preservation of open space, referred to as 'greenbelt' by both.[64] Wurster's plans were developed according to guidance from the Educational Facilities Laboratories and, it is suggested by Stefan Muthesius, informed by émigré architect and founder of the Bauhaus, Walter Gropius's imported form of Modernism at Harvard and MIT.[65]

The expansion of Berkeley required 'demolishing many older buildings and minimizing automobile circulation on the campus through perimeter parking', as well as the tower

and open space programme, all strategies that emerged at the College as the campus plans developed in parallel with the new buildings.[66] These characteristics may not have been apparent in Worthington's early drawings, but it is fair to assume that Gibbon was familiar with Wurster's approach. The parallels extend beyond the organising devices of the plan; halls of residence in Berkeley and in Manchester were similarly designed using bespoke prefabricated systems. Further, the city of Berkeley aided the university expansion in a mutually beneficial deal that resonated with the assignation of land by the Manchester Corporation to the College. It was then, the physical as well as the political fabric with which the College engaged.

Following the death of Sir Hubert Worthington in 1963, Arthur Gibbon was commissioned with the design of the later stages of the campus organisation, formalising the role he had incrementally assumed. The systematic association of curriculum and building programme, later evident in the plate-glass universities programme and presented as 'socio-diagrams' in development plans, was not yet general visual currency or part of design processes.[67] In Manchester, the 'long-term development' of the site and buildings was a collaborative experiment. As such, its status would feed into and inform the University Grants Committee's policies for development and the evolution of the plate-glass universities.[68] When Sussex, the first of the plate-glass universities, was founded in 1958, the appointment of a consultant architect was regarded as essential.[69] The College's appointment of a professional team in 1956 was in advance of most national programmes. This could be partially attributed to the experience of the city of Manchester in promoting such ideas, and in their comprehensive approach led by Rowland Nicholas in his direction and authorship of the city's ambitious and comprehensive 1945 Plan.[70]

When the Robbins Report was published in 1963, the expansion of the College was predominantly planned and already under construction.[71] It was unlike any campus, other than its immediate predecessor, Imperial College London.[72] Imperial, however, had involved more direct intervention into the existing Institute buildings (by the architect Thomas E. Collcutt, 1887–93) and the site, whilst slightly sloping, was not as polluted or knotted as that in Manchester. The first masterplan for Imperial (Norman and Dawbarn, 1956) was subject to substantial revisions intended to preserve more of the historic fabric, and its eventual composition was tighter and more introverted than that of the College.[73] Plans for the College also predated most of the redbrick university post-war development plans, and those for all the plate-glass universities. There is one image that seems to capture what the architects were trying to do at UMIST. It is a photographic print, in an elongated landscape format, of a painting by the architectural perspective artist Peter Sainsbury (**Figure 5**). The image is unusual in its format. Notable is the position from where the view was taken; it is from the south, and shows the proposed campus with the city of Manchester behind it, as approached from London Road, one of the city's main arteries. It is cleverly composed in two-point perspective; the centre is deliberately positioned at the south-east corner of the proposed maths tower. Two darker and domed Victorian towers (the Refuge Assurance Building and the London Road Fire Station) flank the bright white orthogonal volumes of the campus, and the modern city is recognisable by the white slabs of Rodwell Tower (Douglas Stephen & Partners, 1965) and Piccadilly Station (R. L. Moorcroft, 1964) set in

the background, on the far right and above the shadowy viaduct that sinks into the campus mass. As the perspective indicates, the city and campus were combined at UMIST. The campus masterplan, as built, allowed the interface of 'town and gown'. Where the campus planning swept away the old grain, the city adjusted itself to the new form.

Fig. 5. Perspective painting by Peter Sainsbury for Cruickshank & Seward of the new campus. The new white buildings contrast against the soot-blackened Victorian city in the background. Manchester, Manchester Metropolitan University Special collections, Cruickshank and Seward Archive. Reproduced courtesy of Manchester Metropolitan University Special Collections.

The new form is best articulated through two of the thirteen buildings, the Renold Building (a lecture room block) by Arthur Gibbon and Gordon Hodkinson for Cruickshank & Seward, completed in 1962, and the Chemical Engineering Pilot Plant, designed by Harry M. Fairhurst and completed in 1966. The Renold Building was a new type of university building, and the Pilot Plant was the most innovative scheme amongst Fairhurst's post-war work. In each is also seen the continuing influence of external factors, albeit progressively informed by the emergent context of the developing site, rather than the statute and governmental interplay that defined the site procurement and its limits. The following section outlines their development as integral to setting the architectural tone, and as innovative within their type, despite an evidently mainstream appearance.

The Renold Building

A scheme for the lecture room block, 'comprising eight storeys', was proposed in May 1957.[74] The overall master plan was still in flux, and responsibility was handed to Cruickshank & Seward to resolve the finer details of siting, in consultation with Worthington. In agreeing the alignment and general form, the architects consolidated the idea of 'quadrangles' as organising devices for a sequence of buildings.[75] The eastern and southern facades of the Renold Building formed edges to two new open spaces at the heart of the campus. The scheme itself eventually took the form of a podium and tower, and is one of the earliest examples of this arrangement in the country.[76] The podium housed large lecture theatres, and the tower contained smaller theatres and seminar rooms. The angled east facade of the tower was the result of an

acoustic study, and followed the profile of the rear of the vertically stacked smaller theatres. The tower was positioned as far away from the adjacent railway viaduct as possible, and the podium was acoustically insulated by virtue of the significant topographical shift between the viaduct, the parallel street and the rest of the campus to the south.[77] The provision of two entrances, one at first floor level to the north side and one at ground level to the south, exploited this difference in datum. It also required the provision of a bridge link from Altrincham Street that traversed the site service road below.

Although the Renold Building was the second building to be completed, it had a longer period of gestation than the rapidly delivered Staff House. As such, the treatment of its facades was a forebear to the rest of the campus architecture. The building was first discussed in terms of its appearance after H. T. Seward tabled artist's impressions. Comments recorded in the minutes centred upon the style of the elevations, described as 'contemporary'.[78] Worthington emphasised the importance of the decisions attached to the lecture room block as 'it would tend to set the general style for the whole of our development'.[79] The Planning and Development Committee was 'strongly in favour' of Cruickshank & Seward's treatment, 'rather than an adherence to more traditional lines'.[80] The assembled group also decided that it was not necessary to finish each new building in the same material; harmony could be achieved in other ways, such as through the formal association of elements and the 'treatment of paths, paving and retaining walls which would draw the campus together'.[81]

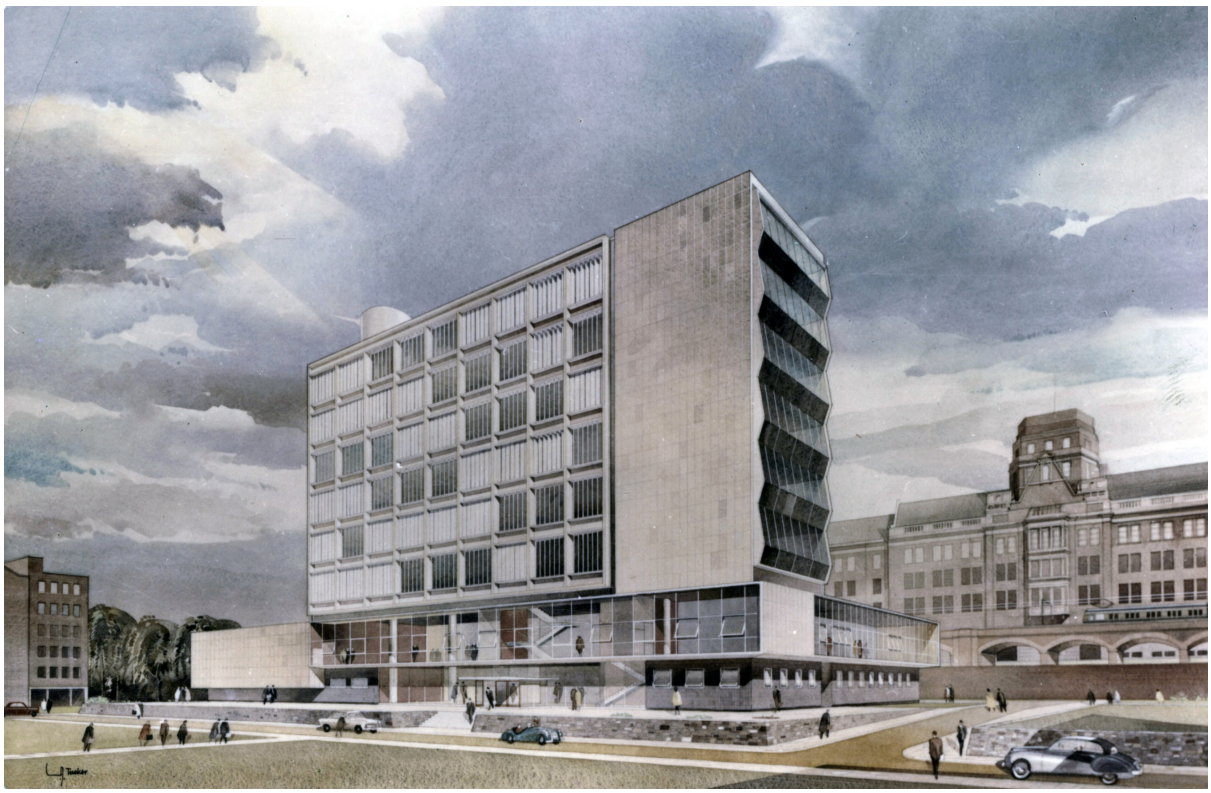

Fig. 6. Artist's impression of the Renold Building by L. Tucker. Surprisingly, this shows cars in front of the building when the campus was eventually designed to be car free and serviced from its perimeter. Manchester, Manchester Metropolitan University Special Collections, Cruickshank and Seward Archive. Reproduced courtesy of Manchester Metropolitan University Special Collections.

Members of the Planning and Development Committee were invited to inspect other sites before making final decisions about the stylistic treatment.[82] A special meeting was held to discuss the material finishes for the lecture room block, and one outcome of these inspections appears to have affected the selection of material: Sir Charles Renold stated 'that there appeared to be a general opinion in favour of Portland stone'.[83] Any exposed concrete was white, to match the stone, as were the adjustable louvres on the south facade, deliberately manufactured in white fibre-cement.[84] The louvres are long gone, but one anecdote concerning their manufacture is redolent of the threshold between craft and mass production so often encountered during the mid-century. The project's architect, Gordon Hodkinson, visited the cement factory charged with making the louvres, and drew the S-curve of the profile on the factory floor with a piece of chalk, which was traced over and used as the template from which the louvres were formed.[85] Modern did not always mean machined, cold or monochromatic. Gibbon introduced a blue band of faience to the exterior of the ground floor, subtle colouration to the spandrel panels, and proposed the use of colour internally, to be glimpsed from the outside.[86] These materials and colours informed much of the proceeding development.

In the interior Gibbon wanted the vivacity of the student population to provide life and colour. The Planning and Development Committee embraced this approach, and the large circulation areas on the ground and first floor were seen as a 'valuable aid to creating a communal life'.[87] These spaces were treated neutrally with contrasting polished wood and simple rough concrete, and eventually provided the backdrop for a period, abstract mural, *Metamorphosis* by Victor Pasmore, in the lower of the two halls.[88] The visual separation of the tower was achieved by using elegant birdsmouth beams that facilitated the continuous clerestory window at the junction of the two formal elements. These 'cantilever pre-stressed reinforced concrete beams' were sufficiently experimental for the College, the architect and the engineer to test the solution on a model in the Department of Structural Engineering, and the results were published in a journal.[89] The Lecture Room Block subcommittee commented that '[a]n unusual feature of these beams is the slot which runs full length on both sides and into the cantilevered splayed ends. The slot is an architectural feature.'[90]

The most prominent device for display and circulation, however, was the stair tower, a perpendicular projection of perilously thin glazing bars. This element was part of the evolving modern language of the firm, and had its predecessors in their buildings at Wythenshawe and its growing family in the college and university buildings to come. Here, it was purposefully employed to encourage students to use the stairs, by affording excellent views, and in turn put the students on display.[91] Conscious that the lid of the podium would be exposed to those ascending and descending, Gibbon applied a diamond check pattern in bonded gravel to the roof, and positioned rooflights in a deliberate composition. In a final flourish for the exterior, and with a nod to eminent modernist architects Oscar Niemeyer and Pierre Luigi Nervi, Gibbon instructed Gordon Hodkinson, in full view of the design team, to define the curved profile of the rooftop plant enclosure. With a single freehand sweep, Hodkinson made his mark, and was then instructed to set out the curve.[92] Strong volumetric elements that housed plant

equipment on roofs were another hallmark of Cruickshank & Seward schemes across Manchester and further afield.

Fig. 7. The Chemical Engineering Pilot Plant at night, with its scientific instruments on display. Manchester, Manchester Metropolitan University Special Collections, Visual Resource Centre Slide Collection (ref. ZW-2L-67). Reproduced courtesy of Manchester Metropolitan University Special Collections.

The Chemical Engineering Pilot Plant

In the Chemical Engineering Pilot Plant (1966), Fairhurst realised their most adventurous project on the campus (**Figure 7**). The building, and the adjoining sculptural wall by the artist Antony Hollaway, formed the eastern boundary of the site.[93] The bold coloured volumes of the roof-mounted cooling plant had a plastic quality, and the floating fluid shapes above contrasted against the orthogonal form below. The building was effectively divided in two; this was expressed clearly by the use of curtain-wall glazing to one end, and blue engineering brick to the other. The glazed section was open through all four floors, designed for undertaking large-scale experiments and handling large pieces of scientific equipment. It was intended to exhibit the students' experiments to those passing on London Road, perhaps with the earlier Daily Express Building (Sir Owen Williams, 1938) in mind, whose printing machines were on display to passers-by on Great Ancoats Street.[94] Specific colours defined the utility service runs, five years before Richard Rogers and Renzo Piano designed the Pompidou Centre in Paris. Without explicit design intent, driven primarily by function, the filigree lattice of kit, transoms and mullions and the reflective qualities of the glass provided a sense of science and its complexity, visible from London Road, a major arterial route of the city. On each floor, a narrow band within the curtain wall extended laterally across the brick

facade to provide clerestory windows to the laboratories and offices. This lightened the whole building by defining the masonry as cladding rather than structure. The entire block was grounded using a plinth wall at grade that extended to enclose the service yard. This was the most functionally defined of Fairhurst's post-war schemes, and yet the most progressively modern.

The first wave of campus development was completed by 1970. Its southern edge, contained by 'Link Road 17/7' (known as the Mancunian Way from 1964), turned the gable ends of its towers to the road and offered blank, defensive facades in the Ferranti Building (Cruickshank & Seward, 1969) and the lecture block of the Maths and Social Sciences Building (Cruickshank & Seward, 1970). The architectural language established in the earliest buildings was evident in all the schemes that followed, despite tightening budgets. Gibbon also had a final contribution to make. The very first formal proposal for the campus included a stair from Altrincham Street to the first quad, and as the Site Architect, Worthington was originally responsible for the design of this stair. As the master plan developed and the lower-level service road required bridging, Worthington and Gibbon were to collaborate over the design of the bridges to ensure harmonious style.[95] Following Worthington's death, Gibbon assumed the role of designer for the stair, as well as the bridges to the Renold Building and the Union. He originally proposed the curved sweeping flights onto his 'great lawn' to be without a handrail – a beguiling Brazilian-style gesture, clearly referential to the work of architect Oscar Niemeyer.[96] Ultimately, handrails were added and made from bronze. The rail at the head of the flight, from where one has a commanding view across the campus, was inscribed 'The Sir Hubert Worthington Stair', a memorial that remains visible to this day.

Conclusion

UMIST was city and institution in a literal and in a metaphorical sense. Its first new buildings were civic in their function: communal spaces to learn, relax and refresh. Its position, as of and in the city, was advantageous as the nation sought to address its future through education, research and development in the technology sector. The assembled architects were senior figures of an architectural establishment that, until the mid-1950s, remained very traditional. Despite this, a consensual modernising agenda emerged, and this underwrote Arthur Gibbon's relationship with Bowden as the most influential agent in the production of the campus architecture. Expressive of his admiration, Bowden remarked:

I have seen several of Aalto's buildings both in America and in Scandinavia, and I do not believe that any of them are any better, if as good, as the Renold Building which Mr. Gibbon designed for us. This of course is only the opinion of one amateur, but my own belief in the merit of this building has been supported by one of the city planners of Rotterdam, who told me it was the finest building he had seen in Europe.[97]

UMIST did not, however, stem from one good idea and did not have a sole champion, although Bowden undoubtedly had the vision actively sought by the Education Committee and the University Grants Committee when making the appointment. In 1993, he was described as 'a visionary and expansionist, who would have been quite

frustrated in the present era of efficiency gains and tight budgetary control'.[98] It is perhaps fortunate then, that the University Grants Committee was inexperienced in the stewardship of large-scale development, and that cost targets for construction were less restrictive in the early years of building. Nor was the campus formed from a single source of precedent. It was an application of Continental and North American ideas in a collaborative atmosphere. In 1962, as the first wave of new buildings were about to be handed to the College for occupancy, the Planning and Development Committee proposed that the respective project architects be invited to comment upon *any* material proposals for new buildings, signage, furniture or landscape in the following two years.[99] This was symbolic of the spirit of shared endeavour, and in this sense UMIST could be described as 'utopianist'.[100]

In the development of the UMIST campus, the relationship between the networks of government and the governance of the institution affected the spatial and material outcomes. The central government demand for the expansion of technological education met with a strong local tradition and institutions with long histories. Whitehall and the Manchester Corporation had to cooperate with one another to achieve their collective aims. The local committees were in almost constant communication with the University Grants Committee. In the early stages of development, the University Grants Committee was learning from the active construction, and latterly it began to exert more financial control, which in turn impacted upon the architecture. There was considerable discussion locally between the various bodies charged with delivery and the local authority. The inner-urban motorway and river culvert determined certain massing and form, as did conditions imposed by British Railways. Political interplay, policy, planning and infrastructural conditions were all filtered through an assembled group of architects and other committees working in a very specific location, and composed of its own networks founded upon a military industrial complex, both shrouded and exploited by civic and civil undertakings.

Notes

[1] D. Egerton, *Warfare State: Britain, 1920–1970* (Cambridge: Cambridge University Press, 2006). As well as Edgerton's treatise on warfare and the State, see M. Grant, *After the Bomb: Civil Defence and Nuclear War in Cold War Britain, 1945–68* (London: Palgrave Macmillan, 2009).

[2] Edgerton, *Warfare State*.

[3] For a detailed description of the Labour government's policy and response to these reports see J. Bocock and R. Taylor, 'The Labour Party and Higher Education: 1945–51', *Higher Education Quarterly*, 57 (2003), 249–65.

[4] Lord Hankey, *Higher Appointments: Report of the Committee appointed by the Minister of Labour and National Service in July 1943 (Chairman Lord Hankey)* (London: HMSO, 1945), Cmnd. 6576; Percy Report, Ministry of Education, *Higher Technological Education. Report of a Special Committee*

(London: HMSO, 1945); Barlow Report, Lord President of the Council, *Scientific Manpower* (London: HMSO, 1946), Cmnd. 6824, para. 33. Quote from Bocock and Taylor, 'The Labour Party and Higher Education', p. 252.

[5] Manchester was unusual in its delivery of both further and higher education courses in one institution.

[6] Bocock and Taylor, 'The Labour Party and Higher Education'.

[7] Cabinet papers. Kew, National Archives (hereafter NA), CAB 24-/55/82.

[8] Gary Willis, 'Fields into Factories: The Impact on the Post-War Rural Landscape of Britain's Second World War, 1936–1946', Northumbria University, 'New Lives, New Landscapes: Rural Modernism in 20th Century Britain', 1–2 August 2019.

[9] Julian Garratt, 'Atomic Spaces, North West England: 1945 to 1957' (MSc dissertation, University of Manchester, 2016), p. 8.

10 www.rhydymwynvalleyhistory.co.uk [accessed April 2023]; English Electric first moved to the site at Warton in 1948. C. G. Keil, 'Supersonic Wind Tunnels: Details of the Two New High-Speed Tunnels Operated by English Electric Aviation Ltd. at Wharton', *Aircraft Engineering and Aerospace Technology*, 32 (1960), 338; J. Aylen, 'Bloodhound on my Trail: Building the Ferranti Argus Process Control Computer', *The International Journal for the History of Engineering & Technology*, 82 (2012), 1–36.

[11] The other two centres were at the University of Cambridge and Birkbeck College, London. In Cambridge the EDSAC stored program computer was developed, and Birkbeck's research connected it with the British Tabulating Machine Company. See M. Wilkes, *Memoirs of a Computer Pioneer* (Cambridge, Ma.: MIT Press, 1985), and Andrew D Booth, 'Computers in the University of London, 1945–1962', in Nicholas Metropolis, Jack Howlett and Gian-Carlo Rota (eds), *A History of Computing in the Twentieth Century* (Academic Press, New York, 1980), pp. 551–61.

[12] 'Proposed talks on future of College of Technology: Dr B. V. Bowden to be New Principal', *Manchester Guardian* (27 June 1953), p. 3.

[13] *Ibid*.; D. Johnson, 'What Manchester did Yesterday', *Guardian* (15 December 1975), p. 5.

[14] Geoffrey Tweedale, 'Bertram Vivian Bowden', *Annals of the History of Computing*, 12 (1990), 138–40.

[15] Paul Drath, 'The relationship Between Science and Technology: University Research and the Computer Industry 1945–1962' (PhD thesis, University of Manchester, 1973).

[16] Manchester, University of Manchester Archives (hereafter UoMA), GB 133 USC/4/1, p. 90.

[17] S. Lavington, *A History of Manchester Computers* (Manchester: The National Computing Centre, 1975).

[18] S. Lavington, *Early British Computers: The Story of Vintage Computers and the People Who Built Them* (Manchester: Manchester University Press, 1980).

[19] B. V. Bowden, *Proposals for the Development of the Manchester College of Science and Technology* (Manchester: The Manchester College of Science and Technology, 1956), unpaginated preface.

[20] Manchester Modernist Society celebrated the campus with 'Campus Day': http://umistcampus.wordpress.com/2012/06/26/manchester-modernist-society-designate-

conservation-area-status-to-the-umist-campus/ [accessed 5 September 2024]; C. Hartwell, *Manchester* (New Haven, CT and London: Yale University Press, 2002), pp. 123–5.

[21] The old universities fall into three descriptive classifications: 'ancient' (Oxford, Cambridge, St Andrews, Glasgow, Aberdeen, Edinburgh and Durham), 'redbrick' (Birmingham, Liverpool, Leeds, Sheffield, Bristol and Manchester) and 'plate-glass' (East Anglia, Essex, Kent, Lancaster, Sussex, Warwick and York – also known as the 'Shakespearian Seven') – attributed to the officers of the University Grants Committee: T. Birks, *Building the New Universities* (Newton Abbot: David & Charles, 1972), p. 15. The Colleges of Advanced Technology programme was instituted in 1956, and applied special status to ten colleges, which later became universities. See Robin Simmons, 'Science and Technology in England and Wales: The Lost Opportunity of the Colleges of Advanced Technology', *British Journal of Educational Studies,* 69 (2020), 735–51.

[22] The 1905 agreement situated the University Faculty of Technology within the College.

[23] Bowden, *Proposals*, p. 31.

[24] The University of Manchester Institute of Science and Technology, *1824–1974, 150 Years of Progress at UMIST* (Manchester: University of Manchester/UMIST, 1974), p. 9.

[25] NA, UGC 7 /895 (University Grants Committee, *Higher Technological Education – Development of Manchester College of Technology*).

[26] In Manchester, the first phase of Openshaw Technical College (Halliday and Agate, 1954) was amongst the first post-war buildings in the city, and was later joined by the College of Building (1957), West Wythenshawe College of Further Education (1958), the Domestic and Trades College (1960), Moston College (1962), and John Dalton College (1964). See M. Steele, 'The Making of Manchester's Technical Colleges (1954–1964)' (MRes. thesis, Manchester Metropolitan University, 2014); NA, UGC 8/ 895 (Manchester Municipal College of Technology, *Application to the University Grants Committee for the Years 1952–1957, supplementary statement*).

[27] B. Salter and T. Tapper, *The State and Higher Education* (Ilford: The Woburn Press, 1994), p. 107. See also Bocock and Taylor, 'The Labour Party and Higher Education'. For an excellent account of the University Grants Committee's changing relationship with the government in the post-war period, see M. Shattock, *The UGC and the Management of British Universities* (Buckingham: SRHE and Open University Press, 1994).

[28] Salter and Tapper, *The State and Higher Education,* p. 107.

[29] University Grants Committee, *University Development 1935 to 1946* (London: HMSO, 1948), para. 6. In the period 1939–45, the College was put to use as a research and training facility for the British and United States military, during which period the Textile Technology Department produced a thread for use with 'sticky bombs'.

[30] The professions were served by the Goodenough Report (medicine), the Teviot Report (dentistry) and the Loveday Report (agriculture). The term 'machinery' is utilised in the Barlow Report: Barlow Report, Lord President of the Council, *Scientific Manpower* (London: HMSO, 1946), Cmnd. 6824, para. 33. It seems unusual now that the Ministry of Education was not involved in either the

advice or funding allocation in Higher Education provision; it was not until 1964 that responsibility for the University Grants Committee was transferred from the Treasury to the newly formed Department of Education and Science. Bocock and Taylor describe the 'furious lobbying' (p. 258) by both the universities and the University Grants Committee against any transfer of power to the Education Ministry as suggested in the Barlow Report. See also Shattock, *The UGC and the Management of British Universities*, p. 8.

[31] This was eventually realised in Keele in 1949. Keele was in many ways an anomaly, rather than a test case. It was founded in 1949, and was a forerunner of greenfield campus development in Britain, but its architecture was called into question. It was the brainchild of A. D. Lindsay, former Master of Balliol College, Oxford and ardent Labour supporter. He had been interested in establishing a university in the Potteries since 1925, and saw the advice of the Barlow Report as an opportunity to test his ideas. See Birks, *Building the New Universities*, pp. 10–11; S. Muthesius, *The Postwar University: Utopianist Campus and College* (New Haven, CT: Yale University Press, 2000), p. 105; Bocock and Taylor, 'The Labour Party and Higher Education', pp. 260–1.

[32] *Higher Technological Education: Statement of Government Policy* (London: HMSO, 1951), Cmnd. 8357. Bocock and Taylor argue that there was no strong tradition of Labour policy on universities, and that they also fought entrenched elite liberal views of what an English university should be, which did not include technological or eminently vocational study. They also describe the existing universities as 'reluctant expansionists': Bocock and Taylor, 'The Labour Party and Higher Education', p. 256.

[33] The awarding of a separate independent charter to the College was championed by the vice chancellor of the University, John Stopford, in November 1951, only one month after the general election. Stopford was a physician and a leading member of the Joint Research Council that studied the relationships between industry and science. His primary concern was the continuing provision of higher education level technological teaching in Manchester, and his fear was that the Ministry of Education would push the College 'right down to the level of one of these colleges in neighbouring towns': NA, UGC 7 /895 (letter from John Stopford to Sir Arthur Trueman, Chair of the UGC, 26 November 1951 and letter from John Stopford to Sir Arthur Trueman, Chair of the UGC, 24 January 1952); Manchester Joint Research Council, *Industry and Science. A Study of their Relationship Based on a Survey of Firms in the Greater Manchester Area Carried out by the Manchester Joint Research Council, 1950–1953* (Manchester: Manchester University Press, 1954); NA, UGC 7 /895 (letter from John Stopford to Sir Arthur Trueman, Chair of the UGC, 30 November 1951).

[34] 'Technical Education (Comparative Expenditures)', House of Commons Debate, 16 December 1954, vol. 535, cc1954–5.

[35] 'Independence for College "Government Policy"', *Manchester Guardian* (13 March 1954), p. 2.

[36] Bowden, *Proposals*, unpaginated preface.

[37] 'Technical Education' House of Commons Debate, 21 June 1956, vol. 554, cc1639–767.

[38] UoMA, TGB/2/5/1, p. 331.

[39] G. E. Cherry, *Town Planning in Britain Since 1900: The Rise and Fall of the Planning Ideal* (Oxford: Wiley-Blackwell, 1996), p. 16; J. Davis, 'Central Government and the Towns', in M. Daunton (ed.), *The Cambridge Urban History of Britain* (Cambridge: Cambridge University Press, 2001), pp. 261–86.

[40] UoMA, TGB/2/5/1, p. 256.

[41] Universities were obliged to submit five-year plans to the University Grants Committee that indicated their capital expenditure on buildings, staff and equipment. UoMA, TGB/2/5/1, p. 258.

[42] 'Schedule 1' was a set of key indicators in relation to areas and costs associated with conventional laboratory style education buildings.

[43] UoMA, TGB/2/5/1, p. 78.

[44] Three years later, as the plate-glass universities were in development, following the creation of an architects' department at the University Grants Committee to filter and disseminate construction and cost information, the tone began to change. The publication of *Methods Used by Universities of Contracting and of Recording and Controlling Expenditure* (University Grants Committee, December 1960) built upon the Gater Report on the financial control exercised by the University Grants Committee. The language used indicated a tightening of budgetary controls and the methods used to establish such. UoMA, TGB/2/5/1, p. 72.

[45] UoMA, TGB/2/5/1, p. 571.

[46] In a letter to Sir John Wolfenden, Bowden acknowledged the 'unusual' financing provision that the University Grants Committee had made to the College and that he hoped it could continue. He made clear that the situation had allowed the construction of buildings 'which cost considerably more than a single year's allocation: which take three years to complete': UoMA, TGB/2/1/3, p. 204.

[47] Bowden, *Proposals*, p. 134.

[48] UoMA, TGB/2/5/1, p. 83.

[49] Hartwell, *Manchester*, p. 118.

[50] UoMA, TGB/2/5/1, p. 83.

[51] G. Tyack, *Oxford. An Architectural* Guide (Oxford: Oxford University Press, 1998), p. 290.

[52] W. Whyte, '"A Pastiche or a Packing Case": Building in Twentieth-Century Oxford', *Twentieth Century Architecture*, 11 (2013), 24; 'Manchester University Library', *Design and Construction* (April 1937), p. 223; 'New Architecture at Oxford University', *Architectural Review* (June 1942), pp. 440–4; 'Department of Botany for University of Oxford', *Builder* (11 January 1952), pp. 63–9; 'Dental Hospital', *Architectural Review* (August 1940), p. 51.

[53] A series of plans by Worthington from 1956 to 1961 are held in the files of Lord Bowden, UoMA, BVB papers. See also UoMA: TGB/2/5/1, p. 10, and VCA/7/386 Folder 1. For architects joining the panel, see UoMA, TGB/2/1/1, p. 78.

[54] Fairhursts were a family firm established in 1895. Their heyday was during the Edwardian and inter-war periods, when they build substantially across the north-west of England. Cruickshank and

Seward were established in Manchester in the 1920s, and through Arthur Gibbon in the post-war period had a very successful few years, with UMIST being their most significant contribution to the city. See W. Whittam (1986) *Fairhursts Architects: The History of a Manchester Practice* (Manchester: Department of History of Art and Design, Manchester Polytechnic, 1986); J. J. Parkinson-Bailey, *Manchester: An Architectural History* (Manchester: Manchester University Press, 2000); A. J. Pass, *Thomas Worthington. Architecture and Social Purpose* (Manchester: Literary and Philosophical Society, 1988).

[55] The realignment of the culvert required an Act of Parliament, and if passed before Compulsory Purchase Orders had been completed would have artificially inflated prices on outstanding acquisitions.

[56] UoMA, TGB/2/5/1, p. 297.

[57] *Ibid*., p. 212.

[58] Worthington raised the accommodation to create a colonnaded cloister for sheltered transition between the lecture room block and the proposed Students' Union. Raising the staff areas afforded a greater sense of privacy, and had the dual function of masking 'a drab area of old and irregular brickwork' on the existing mill. The construction was steel-framed with precast concrete floor slabs. The external walls were metal units infilled with glass or wall panels, as required by the corresponding internal function. Its facade was described as an 'uncompromising frame of big squares', but it is its presence and formal configuration, rather than appearance, that is of note here. UoMA, TGB/2/5/1, pp. 403–4; Hartwell, *Manchester*, p. 125.

[59] The scale of the two campuses is not comparable. Berkeley had 10,000 students before 1939, and the College had fewer than 1,000 full-time students by 1956. A further 5,000 part-time students were engaged in 'non-university' level study: Bowden, *Proposals,* p. 137.

[60] Alvar Aalto, 'Between Humanism and Materialism' (1955), lecture at Central Union of Architects, Vienna. First published in *Der Bau* 7/8 (1955), 174–6. Reprinted in G. Schildt (ed.), *Alvar Aalto: Sketches* (Cambridge: MIT, 1985), p. 130.

[61] Marc Treib suggests Wurster's 'influence' on the campus planning at MIT. There was no overarching masterplan, but his patronage of Aalto and others meant a break from tradition. M. Treib (ed.), *An Everyday Modernism: The Houses of William Wurster* (Berkeley, CA: University of California Press, 1995), p. 96, n. 29.

[62] *Ibid*., p. 91.

[63] Muthesius, *The Postwar University*.

[64] UoMA, TGB/2/5/1, p. 579; W. Wurster, quoted by P. Allen, 'The End of Modernism', *Journal of the Society of Architectural Historians*, 70 (2011), 354–74.

[65] The Educational Facilities Laboratory was founded by the American Institute of Architects in the late 1950s, and advocated modern planning and architecture. Muthesius introduces Wurster as having 'imbued' various European influences; Allen introduces the 'organic' nature of the master

plan as well as the modernist tendencies in the promotion of towers. See Muthesius, *The Postwar University*, p. 47; Allen, 'The End of Modernism'.

[66] Allen, 'The End of Modernism', pp. 359–60.

[67] Muthesius, *The Postwar University*, pp. 88–9.

[68] The University Grants Committee was inexperienced in procuring large buildings, since there had been no similar period of expansion. In the post-war years, as well as appointing their own architects to assess work, they also began to collect and tabulate cost information that eventually led to standardisation of budgets for particular building types.

[69] Birks, *Building the New Universities* p. 11. Sir Basil Spence was invited to submit a plan for the new university in 1959.

[70] R. Nicholas, *City of Manchester Plan 1945* (Norwich: Jarrold & Sons, 1945).

[71] The Robbins Report recommended the immediate expansion of universities, and that all colleges of advanced technology should be given the status of universities: Committee on Higher Education, *Higher Education. Report of the Committee Appointed by the Prime Minister under the Chairmanship of Lord Robbins 1961–63* (London: HMSO, 1963).

[72] The growth of Imperial College was only slightly in advance of UMIST. The master plan by Norman and Dawbarn, in collaboration with Hubert Worthington, who for many years was consultant architect to Imperial, was published in 1956.''Imperial College', *Survey of London: volume 38: South Kensington Museums Area* (1975), pp. 233–47. www.british-history.ac.uk/report.aspx?compid=47532 [accessed 5 September 2024].

[73] 'Save the Imperial Institute', *Country Life* (23 February 1956), pp. 329–30; 'Project in Kensington', *Architects' Journal* (6 February 1958), pp. 197–9.

[74] UoMA, TGB/2/5/1, p. 43.

[75] *Ibid*., pp. 186–7.

[76] Skidmore, Owings & Merrill's Lever Building (1952) is generally acknowledged as the first of this type. John Madin's Post and Mail building has also been cited as an early British example, but this was not completed until 1964. See A. Clawley, *John Madin* (London: RIBA, English Heritage, 2011).

[77] W. A. Gibbon, 'Manchester College of Science and Technology', *Guardian* (9 April 1963), p. 12.

[78] UoMA, TGB/2/5/1, p. 60.

[79] *Ibid*.

[80] In the first instance, the preferred cladding for the first new building was Travertine marble. In the event that the University Grants Committee vetoed this choice then a cheaper alternative, Portland stone, was envisaged. *Ibid*.

[81] UoMA, TGB/2/5/1, p. 262.

[82] Visits to Imperial Chemical Industries facilities were seen as able to provide insight for new technical spaces. Serge Chermayeff's celebrated laboratories (1936) at Blackley in Manchester were examined by the Committee, as were the new buildings of Imperial Chemical Industries' Plastics Division at Welwyn **(**E. D. Jefferiss Mathews, 1955). UoMA, TGB/2/5/1, p. 78.

[83] *Ibid*., pp. 107, 262.

[84] *Ibid*., p. 263.

[85] Interview with Gordon Hodkinson (1 October 2012).

[86] W. A. Gibbon, 'Manchester College of Science and Technology', *Guardian* (9 April 1963), p. 12.

[87] UoMA, TGB/2/5/1, p. 157.

[88] The Edwin Abbey Memorial Trust were consulted on funds to provide a mural in the Civil Engineering building in 1961. Vincent Harris inspected the site on behalf of the trust and rejected the proposed space, due to the poor quality of the space and its daylight conditions. The idea was not abandoned, however, and after Pasmore inspected the site himself and selected an area in which to work, the funds were provided. UoMA, TGB/2/5/2, pp. 235, 375; TGB/2/5/3, pp. 174, 509–10.

[89] R. B. L. Smith and W. Merchant, 'Critical Loads of Tall Building Frames', *The Structural Engineer*, 34 (1956), 284–92.

[90] UoMA, TGB/2/5/1, p. 621..

[91] Interview with Gordon Hodkinson, 1 October 2012.

[92] *Ibid*.

[93] www.c20society.org.uk/botm/hollaway-wall-manchester/ [accessed 19 March 2014].

[94] UoMA, TGB/2/5/2, p. 803.

[95] *Ibid*., pp. 658, 780.

[96] *Ibid*., p. 780.

[97] UoMA, VCA/7/386 Folder 2 (letter from B. V. Bowden to W. Mansfield Cooper, 17 January 1963).

[98] G. C. Wood, 'Conference Introductory Paper: Why Manchester?', *Corrosion Science*, 35 (1993), 1–12.

[99] UoMA, TGB/2/5/2, p. 405.

[100] With reference to Muthesius, *The Postwar University: Utopianist Campus and College*.