Celestial Resistance: Norwegian World Bank Education Project in Zambia

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Abstract
This essay investigates the application of cosmotechnics in architecture through a case study of a large international construction venture, the Zambia World Bank Education Project. Financed in 1969 by the World Bank together with the Norwegian Agency for International Development (Norad), the project envisioned the construction of sixty-five new secondary schools in under four years. A Norwegian consultancy company hired for the project proposed a modular semi-industrial building system and a computer-aided system of process management that defined the project's cosmology. Not surprisingly, expectations of a new computerised modernity did not materialise, and the project was plagued by endless organisational and technical problems. However, as the essay argues, these problems can be considered sites of encounter and resistance, where the conflict between different cosmotechnics becomes apparent. Based on original archival documents, the essay interrogates these resistances to universalist ideas of technology and ontological assumptions embedded and perpetuated through the architecture of post-colonial 'development' projects. This study serves as a first stepping stone towards further investigations into how Western homogenising technologies could be negotiated and challenged for a more pluralistic technological paradigm.

Keywords:
Technology, computer, architecture, prefabrication, Zambia, Norway

The World Bank Education Project in Zambia

'There have been many occasions during the past six months, and there will undoubtedly be more during the next six when I have wished – and will wish for a Point of Aries to which to relate and charter our way through the problems of this project!' lamented Norman Taylor, an architect-in-charge of the infamous World Bank Education Project in Zambia in the opening paragraphs of an official quarterly report for April–September 1977.[1] This remark, seemingly out of place in an official bureaucratic document, referred to Geoffrey Moorhouse's book *The Fearful Void*, in which the author recounts his 3600-mile solo odyssey across the Sahara desert on foot.[2] In preparation for his journey Moorhouse learned about the astronomical first point of Aries – an imagined intersection between the path of the sun (the Ecliptic) and the celestial equator (the Equinoctial) on 21 March each year. An immaterial invention of astronomers and navigators, the first point of Aries regulated relationships between celestial bodies, defined trajectories and predictable moments and assisted in circumnavigation for centuries.[3] For Taylor, such a system of coordinates seemed to hold a valuable promise: '[the point of Aries] gives a man trying to find his way across the wilderness

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of the earth a security that he can find if only he learns the secret of using Aries correctly.'[4] The architect-in-charge longed for a similar celestial body to provide a moment of respite and certainty in the never-ending dragged-beyond-any-reasonable-deadline building venture colloquially dubbed the 'Wild Bank Project' by its participants.[5]

Indeed, the Zambia World Bank Education Project was an undertaking of wild ambitions and Sisyphean proportions. Finalised in 1968, it envisioned the construction of nine new high schools, four new teacher training colleges, one new technical school and improvements and extensions to fifty-six existing secondary schools.[6] With more than seventy simultaneous building sites scattered across more than two thousand kilometres, it was to provide twenty-four thousand new educational places and prepare a new generation of the Zambian workforce for the demands of the post-independence economy.[7] [Fig. 1] Financed with a $30 million loan from the World Bank and with the technical assistance of the Norwegian Agency for International Development, the project was to accomplish these goals in a mere five years. New regulatory and planning bodies were set up within the Zambian ministries to streamline the process, international experts flew from four different continents, and computer-aided technologies were implemented with dramatic and far-reaching consequences. At times, however, it seemed that circumstances conspired against the project: wars ensued, borders were closed, rains washed the roads out, electricity lines were cut off, contractors went bankrupt, copper prices plummeted, materials and objects were stranded in ports or mid-air, items of furniture were wrongly sized, glass elements went missing, and wall panels were broken and twisted out of place. Despite visions of continuity, five project directors and three architects changed through soap-opera-worthy dramatic conflicts.[8] Only the celestial bodies could provide a moment of respite in the project that seemed to have been cursed by the endless turmoil of unpredictable events.

However, as I will argue, these events were not that unpredictable. After all, this was a reality of a large building project conducted in a newly independent country, financed by a wide range of international actors with the involvement of foreign 'experts' and more than fifty contractors, entrepreneurs and local builders. The delays and technical problems were inevitable, resulting from planning and technological decisions taken early in the project. As invited planners implemented imported technologies, they reproduced epistemological and ontological assumptions embedded into Western technology in a setting governed by an entirely different cosmology. These problems and resistances within the Zambia World Bank Education Project can be considered not as ruptures but as sites of encounter between different cosmotechnical orders.[9] This essay draws from the plural understanding of 'cosmotechnics' as defined by Yuk Hui and explores this plurality by investigating technological tensions in a transnational architectural project. The Zambia World Bank Education Project is a particularly appropriate case study of how technological choices harbour epistemological and ontological assumptions that are exported, internalised and reproduced through modernisation and globalisation. Technologies of construction and project management define not only what gets built and how, but also shape the modes and cosmologies of thinking about architecture. As the project brought many actors together across cultural, national and epistemological divides, it offers an opportunity for an in-depth comparative cosmotechnical inquiry that challenges the universalist ideas of technology perpetuated by Western modernity. Responding to this issue of *Footprint's* call for contributions, in this essay I will pay particular attention to the conditions of the emergence of new technology applied in the project and trace its path as it was exported and translated. By looking at the many bureaucratic documents of the project as ethnographic objects, I will investigate constellations of actors and agendas involved in the planning and decision-making of this project and scrutinise the originary implications of their respective cosmotechnics.[10]

Good business

The education sector was a crucial priority in Zambia's First National Development Plan, drafted immediately after the country's independence in 1964. Zambia had some of the lowest education levels in the region, and it was estimated that the lack of school buildings and teachers prevented the country from dynamic economic development.[11] The first 'mapping' of Zambian education needs was conducted between February and March 1966 by a UNESCO delegation.[12] With its roots in Western organisational principles, UNESCO's studies were laced with imported epistemic assumptions that perpetuated the technoscientific priorities of industrialised nations.[13] Reports produced by UNESCO, in cooperation with the UN Development Program and the Food and Agriculture Organisation, calculated the necessary outputs in terms of manpower needs and estimated that the Zambian economy needed more than twenty-four thousand new schoolplaces.[14] Plans for an obligatory four-year common school were set in place, and several hundred teachers were recruited from abroad.[15] Throughout 1968, UNESCO's appraisal mission worked with the Zambian Ministry of Education on a loan application to the World Bank.[16] The negotiations concluded on 11 April 1969: the bank agreed to cover 60 per cent of the total $44 million cost and the foreign exchange component.[17] The project was to last four years, starting promptly on

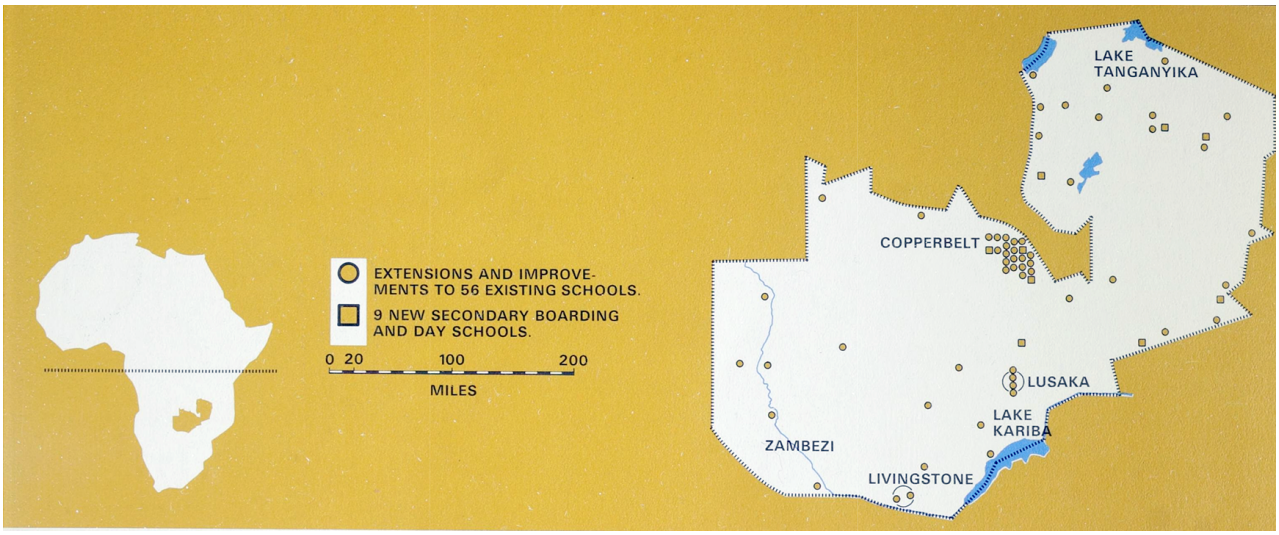


Fig. 1: Building sites of the Zambia World Bank Education Project. Norconsult booklet, 1977.

15 July 1969. At the time negotiations for the loan were underway, Zambia's economy was evaluated positively, so the loan was administered through the International Bank of Reconstruction and Development (IBRD) and not the International Development Association (IDA), which meant that the loan had to be repaid within fifteen years in a period from July 1979 to 1994.[18]

This was the first educational project of such a scale for the World Bank, which was at the beginning of its expansion into education.[19] The bank's role was limited to financing and supervision, it was not responsible for the administration of the project. The borrower had to establish a project unit within the Ministry of Education that would employ and supervise qualified firms of architects, engineers, quantity surveyors and clerks of work.[20] In 1969, Norad, the Norwegian Agency for International Development, stepped into the picture and agreed to cover 70 per cent of the costs for all technical personnel. The Norwegian directorate also financed a third of the bank's loan through multi-lateral agreements.[21] While one might wonder how Norway ended up paying for the Zambian school project, this resulted from a longer-term constellation of Nordic interests in southeast Africa.

Norsk Utviklingshjelp (later renamed Norad) was a Norwegian organisation founded in the mid-1950s to provide bilateral technical and financial assistance to 'developing' countries. In 1962, following the ascendance of Julius Nyerere in Tanganyika, whose political ambitions aligned with those of Nordic partners, Swedish, Norwegian and Danish agencies began their work in southeast Africa under the joint interparliamentary Nordic Council (Nordisk Råd).[22] Tanzania, Zambia, Kenya and Uganda were chosen as 'focus areas' based on the principle of geographic concentration.[23] Norwegian urban theorist Karl Otto Ellefsen argues that Nordic involvement on the continent could be seen as an extension of the tradition of protestant missionaries who strove to impose 'good' by transferring ideas, knowledge and money.[24] There was a shared belief among the Nordic politicians that the social-democratic model could be exported and translated into practical use even in a different socio-economic and geographic context.[25] Projects in education and healthcare were prioritised, since they also contributed to creating the North's idea based on 'common goodwill.'[26] By 1965, Nordisk Råd completed a large Kibaha school project in Tanganyika that integrated education, healthcare and agriculture and consisted of a secondary school, training health centre, farmers' training college, and several units for rural development, nutrition and home economics.[27] Beyond joint projects, each Nordic country pursued bilateral agreements in the region. In 1967, Norway signed an official framework agreement with Zambia, where Norad was to assist in recruiting teachers, engineers, architects, agriculturalists and nutrition experts that would work in different state institutions.[28]

The scheme's Nordic roots are crucial in understanding the Zambian World Bank Educational Project. In the 1980s, Norwegian political scientist Terje Tvedt coined the term 'regime of goodness' to describe Norwegian moral and political ambitions in foreign policy.[29] Cultural theorist Nina Witoszek later developed the idea, arguing that, to a large extent, the idea of 'Nordic goodness' was a product of deliberate international marketing and a 'result of mass delusion'.[30] This image of 'goodness' is based on a largely unexamined story of 'a small forest kingdom which radiated sweetness and light while disseminating goodness to the less fortunate' parts of the world.[31] Situated far from the colonial networks, Norway seemed to be unstained by the moral implications of the colonial past. However, as Witoszek argues, the 'regime' aspect of the term is equally important, as it refers to the heavily technocratic and controlling nature of this 'goodness'. Following Tvedt, in this essay I maintain that images both of 'goodness' and technological control were instrumental to Norwegian participation in Zambia World Bank Education Project.

Norwegian experts and volunteers worked in different parts of the Zambian state and educational institutions since 1965 and enjoyed great respect.[32] Norwegian architect Halvor Fossum worked for the Zambian Ministry of Education following his engagement in the Tanganyika project, where he was employed by a large Norwegian consultancy, Norconsult. Not only did Fossum develop a vast network of social connections within the Zambian state apparatus, but he was so well-liked that he was entrusted with representing Zambia in the negotiations with the World Bank in Washington.[33] Unsurprisingly, he was also instrumental in introducing Norwegian interests into the project.[34] If an international consultancy were to be hired for the Zambia Education Project, Norconsult, former Fossum's employer, would be an obvious choice – although Zambia was free to consider other options.[35] In case Norconsult was chosen, however, Norad agreed to cover 70 per cent of the entire payroll for the technical personnel – making the offer nearly irresistible.[36]

Here, the implications of the 'regime of goodness' become apparent. For the Zambian state, the Norwegian partners seemed reliable and untainted by the colonial past. Most importantly, they were generous, alleviating the financial burden and simplifying the exhaustive search for qualified expertise required by the World Bank rules. From the Norwegian side, however, this was not a gift but a pragmatic business. By hiring Norconsult, Norad was sure to get a large 'good' project off the ground and onto the books, while the consultancy would get a lucrative project essentially paid for by their state department. Fossum,

mediating between the interests of Zambia, Norad, and Norconsult, was essential for this project. Norwegian consultants, informed of the Zambian intentions, took over the responsibilities of the state department and cajoled the Zambian delegation visiting Oslo in the autumn of 1968.[37] The decision to hire a Norwegian engineering consultancy for a school-building project in Zambia had long-lasting physical and material implications that were hard to predict.

The experts

By August 1969, contract details were worked out between the World Bank's Danish architect, Carl Hammerschmidt, the newly hired Norwegian project director, Finn Meland, and Halvor Fossum. The World Bank accepted Norconsult as a firm 'qualified to carry out the work under the loan provided'.[38] Established in 1964, Norconsult was a conglomerate of smaller engineering firms whose goal was to export 'technical know-how' to the developing world.[39] By combining engineering, architecture and construction expertise, the firm could meet the demands of the global construction market where single Norwegian firms could not compete.[40] For consultancy services in the Zambia World Bank Education Project, Norconsult was to receive NOK 11 250 000, and provide over sixty-eight years of manpower.[41]

The project also required new administrative bodies within the Zambian state. A project unit was set up at the Ministry of Education as the main coordination centre dedicated to running the entire project and directly accountable to the World Bank.[42] It was to make most of the planning decisions, select, brief, coordinate and supervise firms of architects, engineers and quantity surveyors, and liaise with contractors.[43] The project unit, comprised of four experts, the project architect, the project director and secretarial staff, were all Norwegians hired by Norad. The project director was to set up the administrative control of the project. He was responsible to the Permanent Secretary of the Ministry of Education and the directors of the World Bank. The Ministry of Education and the project unit were to monitor the project's progress, while all major decisions had to be approved by the bank's representatives.[44] In this way, an entirely Norwegian administrative infrastructure was set up within the project, where Norwegian architects and engineers liaised with their colleagues from Norconsult.

Norconsult's tasks were all-encompassing, including the project's preparation, planning, design and supervision. Despite the firm's experience in other African countries, none of the consultants had worked in Zambia. Norwegian experts were expected to start as soon as possible, joining representatives of the Ministry of Education on aeroplane 'familiarisation tours' of school sites scattered across the country.[45] The consultants were to deliver a preliminary report that assessed the state of the Zambian construction industry and building costs, detailed the availability of raw materials and investigated existing building materials. Drawings of the existing schools awaiting transformation had to be recovered or drafted anew, since they were either non-existent or misleading.[46] If the entire school project was necessary for the new Zambian state as a display of governmentality, topographical and geo-spatial information obtained in the preliminary study was an essential step towards establishing this governmentality.

In *A Genealogy of Tropical Architecture*, Jiat-Hwee Chang argues that buildings, architecture and construction, alongside statistics, maps, medical knowledge and sanitary practices, become acts of governmentality.[47] In the case of the Zambia Education Project, it was not just the future school buildings that belonged to what Ariandam Dutta describes as a 'linear theme of power-display-knowledge', but also the techniques and technologies implemented in their production process.[48] The act of mapping – and the view from the aeroplane – re-instated the cosmology of Western technics, in which the land was 'readable as property' and the world was organised in terms of productive economic and governance potentialities.[49] The Zambian state's facilitation of this technological reiteration exemplifies the complexity of post-colonial nation-building and the persistent character of colonial practices and cosmologies.[50]

The cosmotechnical differences were already detected and briefly discussed in the 120-page report prepared by Norconsult in 1970. In the view of Norwegian consultants, the Zambian construction industry was considered 'set back for unspecified reasons', there was a general lack of building materials and of skilled and semi-skilled manpower.[51] As large post-independence projects were drawing to a close, there were fewer contractors in the industry, and many were not interested in projects outside the urban centres. Under these conditions and within the limited time framework of the project, the consultants saw 'no other choice than a partly industrialised prefabrication system combined with conventional building methods'.[52] Prefabrication was envisioned along the lines of the British CLASP system, where lightweight industrial components from local producers could be used if the producers could cope with the demands of mass production. The components would be delivered on-site and raised in combination with conventional trades. Such a system would speed up the project, as work could happen simultaneously at the factory and on site. The application of unskilled labour trades would be reduced to a minimum, while the manpower of the qualified staff would be fully utilised on site.

However, although the Norwegian consultants perceived a local lack of skilled labour and low levels of craftsmanship, this was not necessarily the case. As a 1977

project evaluation report later indicated, 'this opinion was not normally shared by contractors and local consultants'.[53] Indeed, from the client's point of view, it would have been most beneficial to use as much local materials and labour as possible. The original contract agreement stipulated that consultants should investigate alternative choices of materials and local contractors to secure the project remained within limited budgets.[54] However, due to structural constraints of the international aid provision, the project moved very quickly, and the consultants continued to emphasise the exceptional labour and material conditions in favour of an industrial building system.[55] This planning decision was a consequence of a particular cosmology that called for a selection of specific technics. In their book 'Laboratory Life: The Construction of Scientific Facts', philosophers Bruno Latour and Steve Woolgar discuss how scientists use inscription devices to create a seemingly objective reality in a laboratory.[56] Similarly, by reiterating and documenting the perceived lack of local skilled labour and material shortage, the Norwegian engineers created a seemingly objective reality in which using an industrial construction system seemed the only viable option. If, following Latour and Woolgar, phenomena are constituted by the material setting of the laboratory, then cosmotechnics also depends on and is created by the technically mediated epistemological dimension. In the cosmotechnics of the Norwegian engineers, the scale and conditions of the Zambia World Bank Education Project offered a unique opportunity to test unconventional building technology – although local specialists may have perceived the situation differently.

Towards a new architecture

The Norwegian consultants proposed a construction system that relied on industrially-produced modular components. The conventional approach at the time suggested standardised floor plans. Instead, Norconsult proposed standardising single-room units – classrooms, laboratory, library, workshop, and sanitary facilities.[57] [Fig. 2] This system matched the project's core organisational idea, which encouraged a transition to the basic subject room system, where rooms would be used for specialised subjects during instruction hours.[58] With standardised room units, architects did not have to create new school designs for each of the seventy building sites. Rather, different constellations of rooms could be arranged depending on site conditions, air circulation and insulation. This system also minimised the circulation spaces and made layouts more compact, reducing the costs of water and sanitation works.

With the client's educationalists, the Norconsult architects developed around fifty room units, where room dimensions varied depending on teaching and activity requirements.[59] Volumes could be linked in different directions, creating various spaces. The schools were single-storey buildings set on a standardised block foundation. The load-bearing structure was comprised of cross-shaped columns and U-shaped beams. [Fig. 3] The frame could then be filled with prefabricated asbestos sandwich panels, custom-designed for the project, standardised louvred window elements, and fibreglass panels.[60] Characteristic steel roof arches covered with corrugated asbestos roof sheeting lent the project its signature appearance.[61] [Fig. 4]

Technically, the modular framework was set on a grid of eight by eight metres, with a planning grid of one by one metre and an even finer planning network of 1 decimetre, abbreviated as 1M.[62] The problem with the module, however, was that it implied a transition from British imperial to metric units.[63] Until then, Zambia's construction industry followed imperial measures, but a general transition was envisioned by the end of 1973. The client – and consequently the project unit – instructed Norconsult to use the metric system according to ISO recommendations in all planning for the secondary schools.[64] Although a seemingly trivial decision, this exemplifies yet again the imposed character of the standardised technology unfamiliar to local contractors. Transitioning to the ISO standards would open the project to an international market, forcefully re-inserting it into the cosmotechnics of a unified global capitalist market.[65] However, the intricacies of the metric system had to be explained to the contractors in a special pamphlet with drawings.[66] Advocated for in Zambia, the 1M module was adapted in Norway just a few years prior, and the ISO standardisation still lagged.[67] The Norconsult engineers thus implemented a new technoscientific modernity in Zambia that was hardly possible at home.

This modernity did not stop at the modular construction system. Since all building elements – walls, cladding, floors, windows, louvres, partitions, cupboards, benches and furniture – across seventy construction sites and two thousand kilometres had to conform to the same modular network, there were more than five thousand drawings to control for.[68] From the onset, Norconsult proposed to use a new computer management system, a 'Co-ordinated Building Communication', or CBC for short. The CBC system canalised communication flows between specialists and facilitated the management and organisation of large construction projects.[69] Each building component, material or labour operation would receive a code that was then integrated into the central catalogue and stored on magnetic tape. Different construction documents – drawings, bills of quantities, specifications and price lists – cross-referenced using the same code. [Fig. 5] This was a way to represent the entire building project through codified values and control the elements across all building

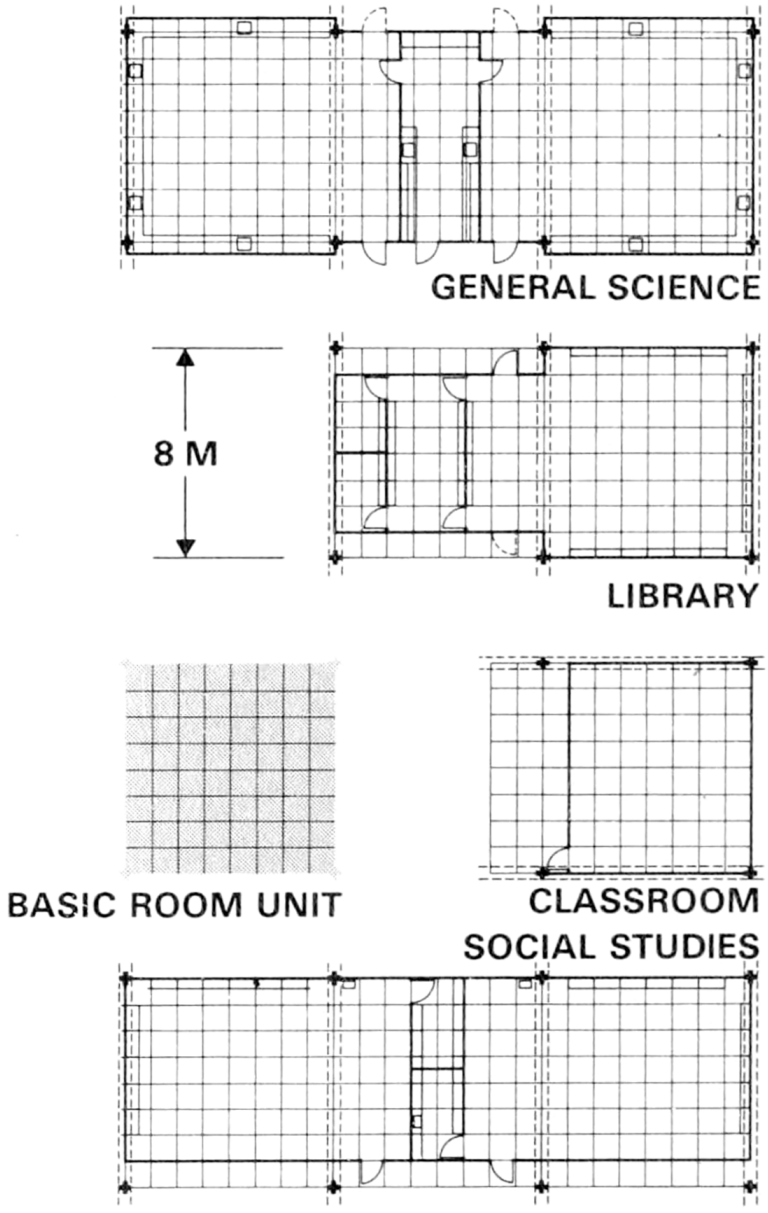


Fig. 2: Basic planning grid proposed by Norconsult. Norconsult booklet, 1977.

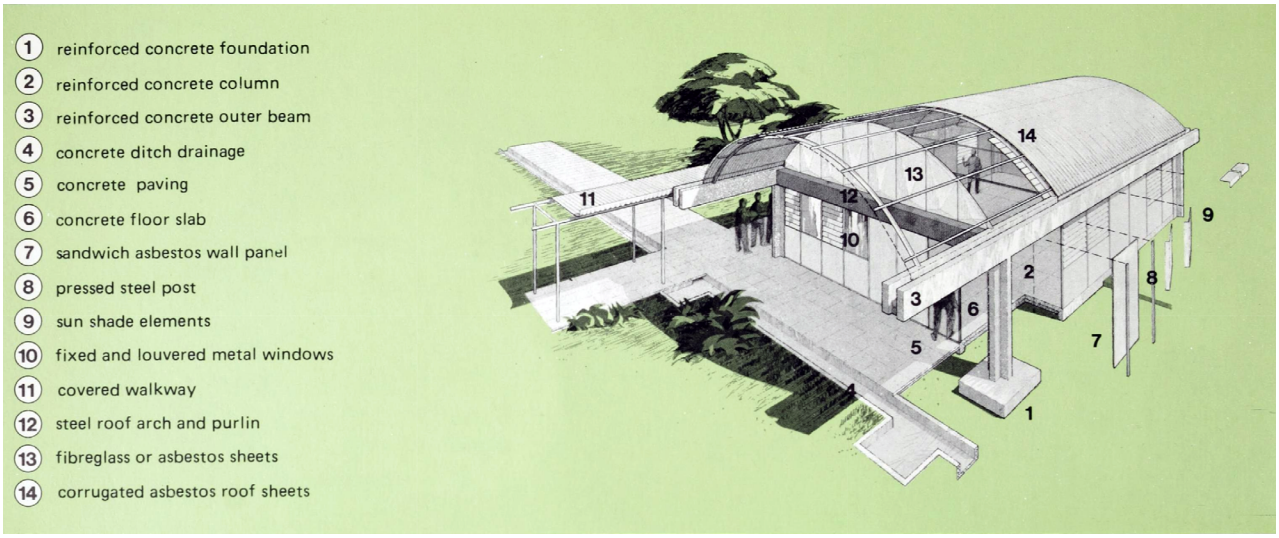


Fig. 3: Elements of a typical classroom unit designed by Norconsult. Norconsult booklet, 1977.

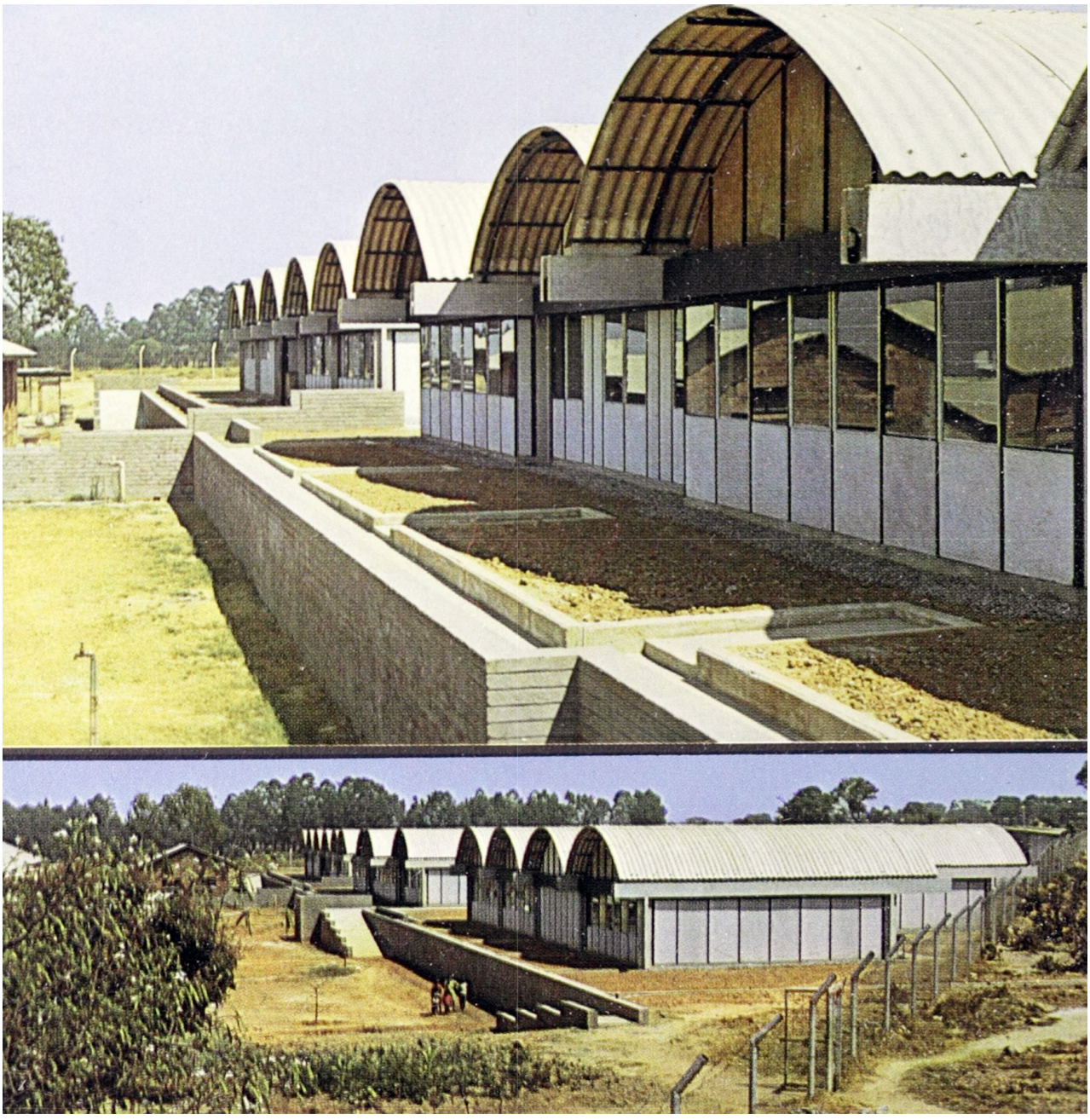


Fig. 4: Typical school pavilions. Norconsult booklet, 1977.

documents. If project documents were correct for one of the schools, they would be right for the rest of the sixty-four schools.

One of the decisive factors in favour of the CBC system was that the consultants could use the Lusaka Data Processing Unit situated at the Ministry of Finance.[70] Since Norconsult had no experience with the data processing system, a senior Danish quantity surveyor flew to Lusaka in May 1970.[71] He was to start working on the central catalogue and introduce the staff at the data centre to the new system while the plans for all the schools were finalised. The same quantity surveyor was expected to return for another ten weeks in September 1970 to continue to work on the master catalogue, and to return yet again at the beginning of 1971 with tender documents for each school. Meanwhile, tapes for each school would be sent to Copenhagen and Oslo to be processed on computers there and then delivered back to Lusaka, where it would be possible to reproduce complete sets of tender documents.[72] [Fig. 6] The computer-based documentation system provided 'significant savings in writing, machine writing, control reading and document production', and allowed Norconsult to work in two teams split across two continents.[73]

Although promising in principle, the computerised reality was far less rosy. The capacity of the data centre was limited, so only two functions of the CBC system could be implemented. The data centre grew in demand among many Zambian governmental institutions, and the time allocated to the Nordic consultants was insufficient.[74] Most of the printing had to happen at night, and these night shifts, according to the project director, resulted in a significant strain on the staff and led to many errors and omissions in the tender documents.[75] The process was heavily dependent on the specialised knowledge of quantity surveyors and programmers, and since their local counterparts were never trained, this resulted in long delays.[76] For example, when the finance controller was sick for several weeks, it was impossible to compute certain documents and specifications required for the project for weeks.[77] However, and most importantly, the implicit technological (and arbitrary) logic of this managerial system had a tangible impact on the project's architecture.

Lasting impressions

CBC originated in Denmark, designed by two brothers, Bjørn Bindslev, 'a Danish architect by training and natural philosopher by inclination', and Knud Bindslev, an engineer and early computing specialist.[78] It was an adjusted version of the Swedish sorting system used for classifying and cataloguing building work and materials in Sweden since 1947 (the SfB system), later adapted for the British market. As the system architects argued, knowledge of quantities was a fundamental pre-condition for effective project management, where materials and labour constituted two main quantifiable elements of the process. However, with its roots in the Swedish system of tender documentation, CBC split the traditional 'all-in-one' tender rates and required contractors to quantify labour and materials into two separate categories of 'activities' and 'resources'.[79] This imposed separation was foreign to many European tender practices, and was used in Sweden and Denmark only. In Norway, the CBC system first appeared in the professional press in 1964, following the extensive marketing efforts of the Polish-educated architect Janusz Ziolko, who headed the Norwegian subsidiary company of the Danish Byggeadminisratsjon.[80] CBC was promoted as part of the aspiration to unify the Nordic construction market, but it was, nevertheless, not recommended for use in Norway. The Norwegian Building Research Institute evaluated the system in a 1967 report, in which engineer Hans Sundh concluded that

> the Norwegian tradition of contracting required a different logic so that the building material and labour costs had to be included as a single entity in the final amount. If [CBC] would be used for Norwegian conditions, it should be done so that there would be no split between the single elements and the work operations – otherwise, the use of the system would be too expensive.[81]

Even in Sweden, the system's rigid logic, which limited its functional flexibility, received much criticism from building specialists.[82]

In Zambia, not surprisingly, the application of the CBC system ran into precisely the same problems outlined for Norway. Zambian contractors were used to working from drawings without relying heavily on the specifications and bills of quantities. The CBC system established a preference for the bills of quantities over drawings, and the computer-generated documents were nearly illegible for any non-trained specialists. [Fig. 7] The CBC logic, which separated elements, construction activities and materials and measured projects in terms of areas and volumes, was so obscure to local contractors that it resulted in lower estimates, incorrect pricing and omissions.[83] Entrepreneurs signed documents without fully understanding what they signed, which led to many delays, disputes and extra costs.[84] Although Norconsult was supposed to arrange introductory courses for local builders, these courses were done in a highly specialised technical language not understandable even to people with professional and technical backgrounds. According to the later reports, no contractors could take advantage of the complex CBC system even five years later.[85]

Tabell 8.04.2. Kodestruktur i 2. og 3. fasett

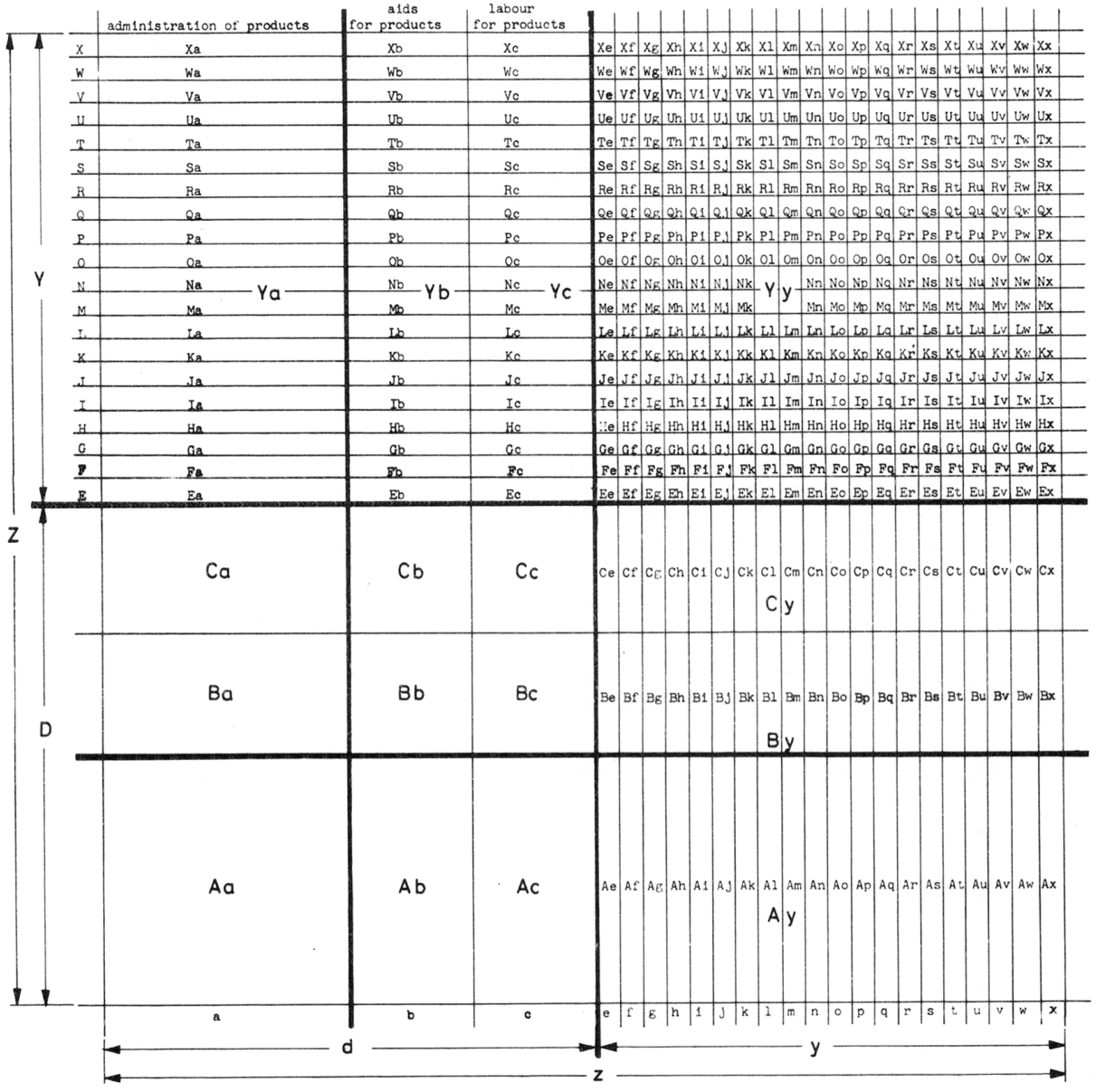


Fig. 5: Coding principles of the CBC system. Teknisk Ukeblad, 1969.

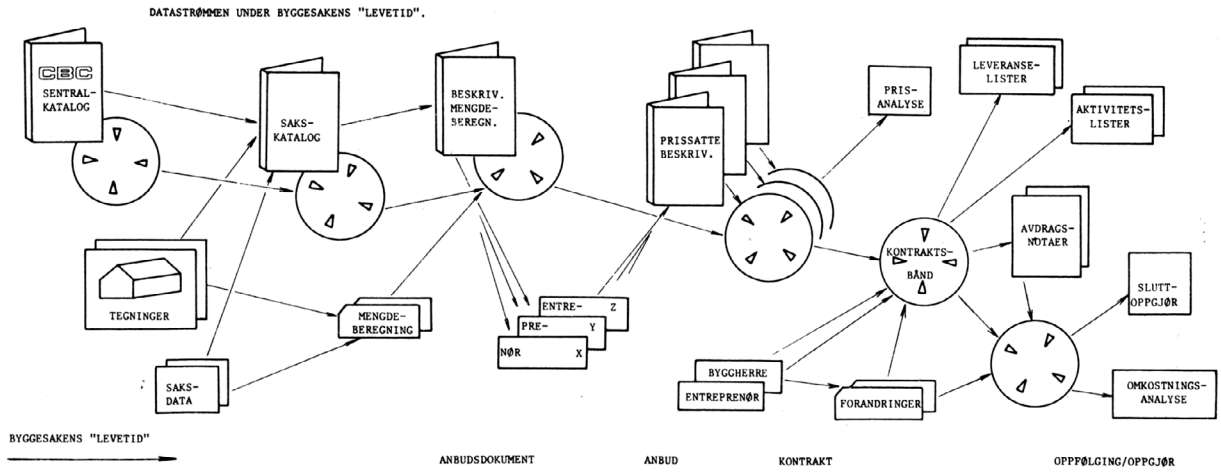
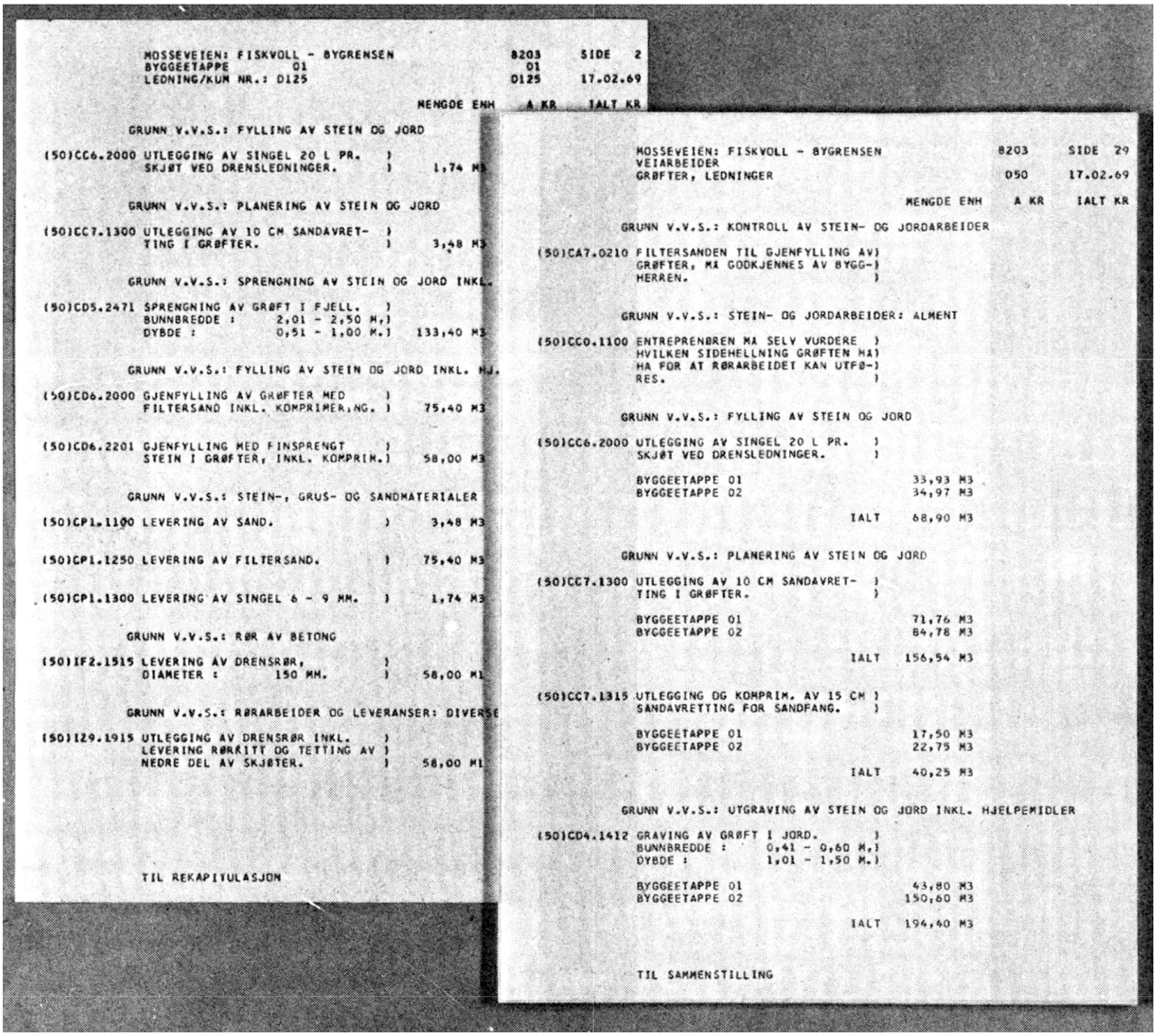


Fig. 6: Envisioned ‘data stream’ facilitated by the CBC building documentation system. Teknisk Ukeblad, 1969.



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MENGDE ENH A KR IALT KR

GRUNN V.V.S.: KONTROLL AV STEIN- OG JORDARBEIDER

(50)CA7.0210 FILTERSANDEN TIL GJENFYLLING AV GRØFTER, MÅ GODKJENNES AV BYGGHERREN.

GRUNN V.V.S.: STEIN- OG JORDARBEIDER: ALMENT

(50)CC0.1100 ENTREPRENØREN MÅ SELV VURDERE HVILKEN SIDEHELLNING GRØFTEN MÅ HA FOR AT RØRARBEIDET KAN UTFØRES.

GRUNN V.V.S.: FYLLING AV STEIN OG JORD

(50)CC6.2000 UTLEGGING AV SINGEL 20 L PR. SKJØT VED DRENSLEDNINGER.

BYGGEETAPPE 01 33,93 M3
BYGGEETAPPE 02 34,97 M3
IALT 68,90 M3

GRUNN V.V.S.: PLANERING AV STEIN OG JORD

(50)CC7.1300 UTLEGGING AV 10 CM SANDAVRETTING I GRØFTER.

BYGGEETAPPE 01 71,76 M3
BYGGEETAPPE 02 84,78 M3
IALT 156,54 M3

(50)CC7.1315 UTLEGGING OG KOMPRIM. AV 15 CM SANDAVRETTING FOR SANDFANG.

BYGGEETAPPE 01 17,50 M3
BYGGEETAPPE 02 22,75 M3
IALT 40,25 M3

GRUNN V.V.S.: UTGRAVING AV STEIN OG JORD INKL. HJELPEMIDLER

(50)CD4.1412 GRAVING AV GRØFT I JORD. BUNNBREDDE : 0,41 - 0,60 M, DYBDE : 1,01 - 1,50 M.

BYGGEETAPPE 01 43,80 M3
BYGGEETAPPE 02 150,60 M3
IALT 194,40 M3

TIL SAMMENSTILLING

Fig. 7: Output documents of the CBC system. Teknisk Ukeblad, 1969.

Practical problems got worse once the project went into the construction phase. Drawings were often misinterpreted on site, resulting in construction mistakes and last-minute alterations. Lists of computerised specifications were 'too sophisticated to be easily understood by the man on a building site'.[86] They required interpretation from the supervisory staff, who had not received proper training to use the system either. Much of the reporting and payment bills on site had to be prepared by the supervisory engineers on behalf of the contractors, adding additional strain on the personnel.[87] On-site alterations and corrections, in turn, had to be re-coded on additional tapes and then re-integrated into the system, defying the principle of a central catalogue.[88] In practice, this led to the bizarre situation where the work carried out was quite simple, but its administration required highly qualified staff, which was not always available.[89] In the end, it seemed that only Norconsult consultants used the system, which proved 'too complicated and too cumbersome', while the other actors preferred to use the established and familiar systems of bills of quantities.[90] Although the CBC system was intended to alleviate the client's workload, it increased that workload, since the Zambian state relied on conventional accounting methods.

One of the main benefits of the CBC system was that at any point during planning or implementation, it was possible to recover measured quantities. However, these estimated quantities proved irrelevant, given the turbulent reality of the 1970s Zambian economy. Despite the original intention to use as many local materials as possible, few local suppliers qualified under the World Bank rules, and many of the components and equipment had to be shipped from abroad. Most of the materials came from Rhodesia and South Africa, imported via a southern route over the Benguela Railway via Lobito and by road via Dar es Salaam.[91] When the border with Rhodesia closed on 9 January 1973, and imports from South Africa were banned, the project's supply chain was disrupted dramatically.[92] Materials, tools and equipment were stranded in seaports, storage facilities and on roads indefinitely.[93] Following the oil crisis, steel and timber prices increased three-fold, while copper prices plummeted.[94] No computer-generated specifications could speed up the process locked in political turbulence.

With the many contractual mistakes, delays in the process, lack of materials and poor management, construction work lagged far behind schedule. Contractors experienced severe financial problems, which worsened over the years, and the Zambian state had to step in to rescue several contractors from inevitable bankruptcy.[95] Furniture procurement and production by the Prisons Department constitute a separate and dramatic chapter of the project.[96] Water tanks were not properly welded, workmanship on the many sites left much to be desired, and the supply of crucial materials – asbestos, fibreglass and wall panels – continued to be erratic.[97] By 1977, custom-designed prefabricated wall panels showed signs of 'extensive and disastrous' failure, and 10 per cent had to be replaced.[98] Although these problems were not a direct consequence of imported technology, they show a profound conflict between different cosmotechnics. The seemingly rational Western technology of project management could do little to streamline the processes in a different political and geographic context whose cosmos was organised according to an entirely different set of epistemologies.

The project and its computer management system were so obscure that in 1978 it came under the scrutiny of the Zambian state. As the project was ending, the project's architect, Norman Taylor, and the project's financial controller, Mr. A. M. Herland, were called for questioning by the Public Accounts Committee assigned by Parliament. As Taylor recalled, intimidating paraphernalia of 'subdued lights, microphones and tape-recordings' was reminiscent of the contemporary interrogation chamber, but the committee's questions were answered.[99] Eventually, all computer-produced documents had to be transformed into conventional form.[100] The CBC system was one of the project's main components and made a big impression on everyone involved. Taylor, the project's longest-serving architect, quoted Einstein, saying that 'modular' was a way 'to make the good easy and the bad difficult'. For Norman Taylor, CBC came to signify 'confusion by computer', and, as he passionately declared his last report, 'anything relating to computers for quantities I would avoid like the plague!'[101] Indeed, before the 'Wild Bank' project was over, the CBC Denmark went bankrupt. In response, Taylor merrily and somewhat vengefully declared: 'The CBC system is now dead!'[102]

Beer and skittles

'To pretend that it has all been beer and skittles would be to deceive. It has been a battle and a challenge', was Taylor's final conclusion on the project.[103] The case of CBC application in school design was particularly interesting, not because of the many challenges it introduced, but because of the symbolic role it acquired in the project. [Fig. 8] According to Norconsult, the CBC system 'liberated the architects and engineers from the tiring and monotonous routines and provided opportunities to work with more meaningful and creative work'.[104] However, most of the time, the architects and engineers were occupied with solving the many problems caused by the system. Both modular construction and CBC promised a new

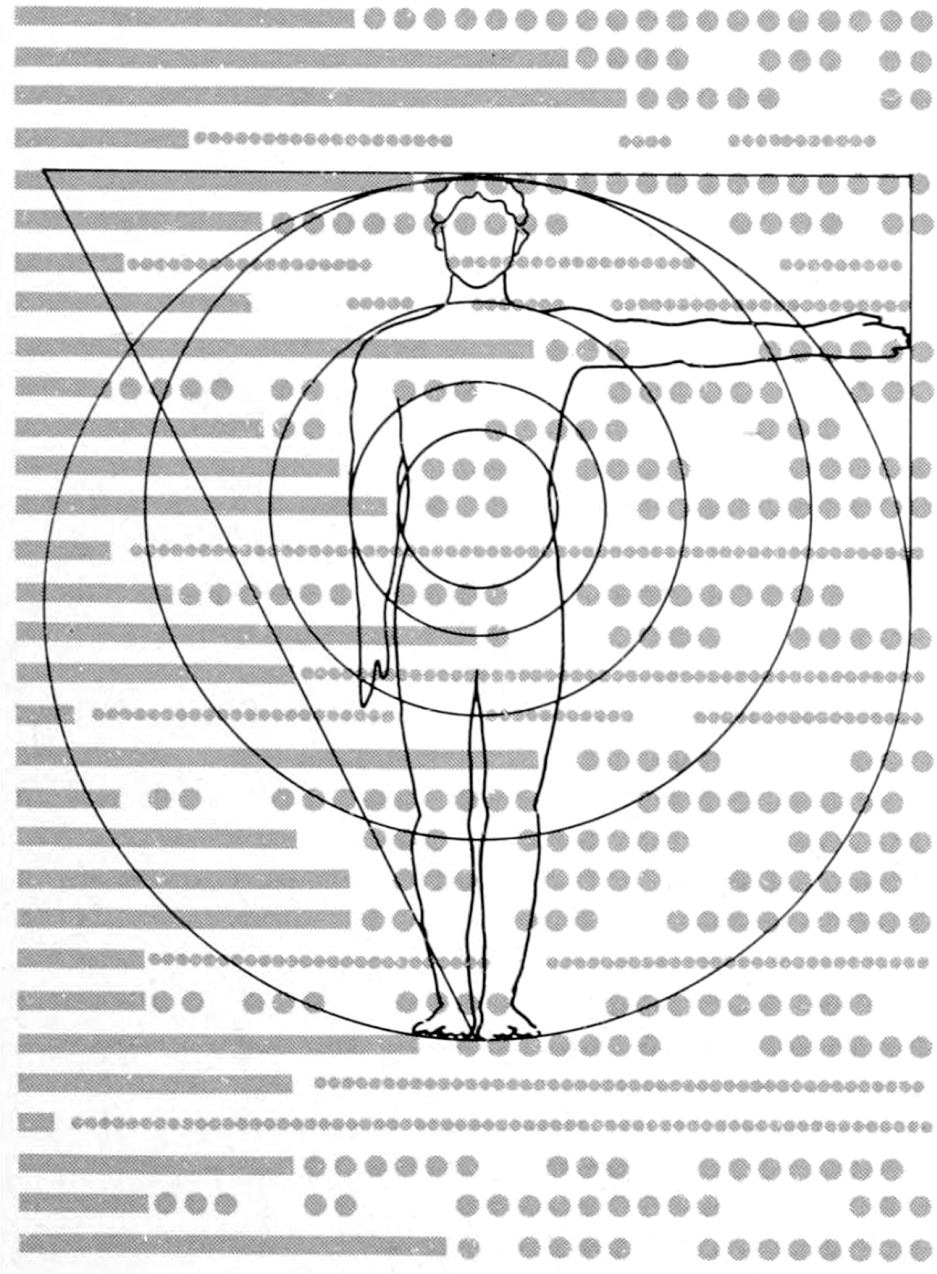

Fig. 8: Esoteric role of the CBC system, as envisioned by Norconsult. Norconsult booklet, 1977.

rational modernity in post-independence Zambia, a promise readily accepted by the Zambian state representatives.

In 1977, after the project had been extended three times, the Zambian Ministry of Education put together an evaluation team of twelve professionals, four of whom were Norwegian.[105] This was a watershed moment for the project: the evaluation was so negative that Norad was determined to keep it from becoming public.[106] Quite tellingly, Zambian participants of the evaluation team were far less critical towards the project than their Norwegian and other Western colleagues.[107] Looking back, the report indicated that since the client did not have any prior knowledge of the CBC system, they 'did not express any serious doubts about its use'. The modular building system was deemed 'reasonable', and the decision to implement it did not cause much tension at the planning stage.[108]

Indeed, for the Zambian representatives, the project initially promised a new, modern way of building, a radical upgrade of existing technologies of construction. If, according to Hui, cosmotechnics represents a unification of the moral and the cosmic order, the choices made by the Zambian political elites already stemmed from the imported Western cosmic order of capitalism, and this allegiance can easily be detected in countless archival documents. Indeed, the values, goals and means of post-independence political elites are often already in conflict with local traditions and the understanding of technology.[109] Marco Pavanini, in his discussion of cosmotechnical pluralism, offers an alternative to the homogenising order of Western capitalism, without ascribing it solely to the low-cost paradigm. To discover its own set of cosmotechnics, a culture would need to perform a deep dive into its own cognitive structures, techniques and technologies.[110] If, following Ani Loomba, the prefix 'post-' refers to supplanting ideological structures, the Zambia school project did not yet rely on post-colonial computing.[111]

Some of the Norwegian architects – a post-1968 generation – were well aware of these dynamics. For example, for many participants, it was clear that the decisions taken by Norwegian consultants abroad 'were based on the sixty years of belief in technology and rational industrial solutions for the developing countries.'[112] Architect Torstein Ramberg, in his contribution to the 1977 seminar on the role of architects in development aid, argued that Nordic specialists 'have the instinct to transfer out technology to others, without considering the direct influences and side effects of this technology in the receiver country.'[113] And while the transfer of the most modern technology seemed to be an effective solution in the short term, it brought problems of continuity and maintenance, since ultimately, most of the imported technology was unsuitable for local conditions. Instead, Ramberg suggested that planners and architects should have been thinking more long-term and base projects on local values and technology.[114] Indeed, towards the end of the 1970s, problems of technology transfer, seen in the light of emergent environmental concerns, became central to critical discussions in the profession. Such discussions on the originary nature of cosmotechnics reflect the benefit of a critical distance, which was not always applied at home.

The genealogy of the Zambia World Bank Education Project reflects the complex paths of cosmotechnical transfer. Following the patterns of former colonial influence, Norwegian engineers imported a set of more 'advanced' cosmotechnics from Denmark. Much of the post-war Norwegian debates on prefabrication were shaped by the British experiments, and not least by the CLASP school system. And while hardly applied at home, these technological ideas were transferred again to Zambia, with a tangible architectural impact. As Joe Nasr and Mercedes Volait argue, decolonisation did not always mean the end of the export or import of ideas, but rather a blurring of the primary linear axes by increasingly complex transnational patterns of dissemination.[115] The import and integration of different cosmotechnics to Zambia presents a good case study. Although British colonial actors stepped down, bureaucratic structures and their established cosmologies persisted. The Department of Public Works maintained what Peter Scriver has called 'departmental thinking', where standardisation and computerisation promised more control in the design process.[116] Norwegian experts lent not only credibility but also a technical framework to a large post-independence showcase of Zambian governmentality. The 'Wild Bank' Education Project amalgamated the interests, rationales and cosmotechnics of different actors that shared responsibility over technological decisions.[117]

Despite incessant criticisms of the project's design and implementation, its architecture received little attention. Listing the project's drawbacks, the 1977 report only mentioned issues with ventilation gaps, the wrong positioning of chalkboards, and insufficient sound insulation between classrooms. Some teachers complained about the unconventional roof structure; others, however, admitted that they provided the project with its distinguishing character. Classroom units were considered adequate, and the new assembly and dining halls were spacious. 'On the whole, the science teaching facilities provided under the Zambia World Bank Education Project are satisfactory', concluded the evaluation report.[118] This note poses a question about the indeterminacy of architecture. If the technology and the principles of the project had so many shortcomings, how was the architectural production so satisfactory in the end? The project was planned within a brief period of promising prosperity but was implemented during years of political

and economic turmoil. The system – or its execution – was flexible enough to adapt to these changing conditions. In the end, the cost of construction was exceeded by only 14 per cent, although the cost of technical personnel ended up three times higher than originally predicted.[119]

The Zambia World Bank Education Project was, indeed, a project of wild ambitions. Negotiating the many often-competing agendas and interests, the project provided more than twenty-four thousand new educational spaces nationwide.[120] However, this was neither a story of imposed technology and expertise that ultimately failed, nor a story of good intentions in a country that was not ready for the technology. Rather, the Zambia World Bank Education Project and its many problems offer an insight into the complex (and often competing) nature of cosmotechnics. This study, however, is not exhaustive and serves as a first step towards further inquiries into a cosmological understanding of technologies and their application in architecture.

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Notes

1. Norman Taylor, 'Zambia World Bank Education Project Progress Report no. 1977/2 & 3, 1 April 1977 to 30 September 1977', 'Introduction and General Remarks' in Box Eaa-L0592, Series RA/S-6670/E/Ea, Norad Archive, National Archives, Oslo, Norway.
2. Geoffrey Moorhouse, *The Fearful Void* (London: Faber and Faber, 2011).
3. See a brief popular explanation in James Stokley, 'Celestial Coordinates', *Science News* 100, no. 13 (1971): 217, https://doi.org/10.2307/3956426.
4. Taylor, 'Project Progress Report no. 1977/2 & 3'.
5. Norman Taylor, 'Zambia World Bank Education Project: Quarterly Report for the Period 1 April to 30 June 1978', Lusaka, 30 June 1978, Box Eaa-L0592.
6. 'NORADs vurdering av rapporten – Vedlegg' (Norad's evaluation of the report) (1977), 1, Box Eaa-L0594, Series RA/S-6670/E/Ea.
7. Ibid.
8. See a letter from Olav Myklebust to Jon Aase regarding Meland on 28 January 1970, in Folder 'Personell', Box Eaa-L0594; or a later letter from Tormod Førland to Norad on 19 April 1976, Box Eaa-L0593, all in RA/S-6670/E/Ea.
9. The term 'cosmotechnics' is discussed in depth in the themed edition of *Angelaki:* Yuk Hui, 'Cosmotechnics', *Angelaki* 25 (2020): 4, 1–2, https://doi.org/10.1080/0969725X.2020.1790828.
10. Latour refers to bureaucratic documents as 'the most despised of ethnographic objects'; Bruno Latour, 'Drawing Things Together', in *Representation in Scientific Practice*, ed. Michael Lynch and Steve Woolgar (Cambridge, MA: MIT Press, 1990), 54. See also Matthew S. Hull, 'Documents and Bureaucracy', in *Annual Review of Anthropology*, 41 (2012): 253. Ben Kafka argues that until very recently, bureaucratic documents had been *looked through* by researchers but seldom *looked at;* Ben Kafka, 'Paperwork: The State of the Discipline', *Book History* 12 (2009): 340–53.
11. Among people over sixteen years old, 75 per cent of men and 95 per cent of women could not write. Meeting note no.3/69 from 21 April 1969; Folder '311.11 Forhåndsdrøftinger, Generelt', Box Eaa-L0595, RA/S-6670/E/Ea.
12. 'Avslutningsdokument: Zam 003-Høyere Skoler' (The Final Document: Zam 003-High Schools), 16 March 1982, Box Eaa-L0596, Series RA/S-6670/E/Ea.
13. World Bank, Report no. 4508, 'Project Performance Audit Report: Zambia First and Second Education Projects (Loans 592-ZA and 645-ZA). 20 May 1983', 'Principal issues', 5. For a brief history of British 'manpower planning' see A. R. Smith and D. J. Bartholomew, 'Manpower Planning in the United Kingdom: An Historical Review', *The Journal of the Operational Research Society* 39, no. 3 (1988):

241–43, https://doi.org/10.2307/2582606; Patrick D. Lynch and Maritza Tason, 'Research on Educational Planning: An International Perspective', *Review of Research in Education* 11 (1984): 307–67, https://doi.org/10.2307/1167238.

14. A letter about the loan agreement and the educational project from the Republic of Zambia to the World Bank, 1 June 1969, Folder 4, 'Avtaler Zambia-Norad', Box Eaa-L0596.
15. Meeting note no. 3/69 from 21 April 1969, Box Eaa-L0595.
16. Esten Dal, 'Planlegging av skoleutbygging i Zambia' (Planning School Development in Zambia), in *Planlegging i u-land: en seminarrapport om norske arkitekters og planleggeres arbeid i u-land* (Planning in developing countries: a seminar report on the work of Norwegian architects and planners in developing countries), ed. Peter Butenschøn and Hans C. Bjønness (Oslo: Arkitekthøgskolen i Oslo, 1977), 120.
17. Norconsult A.S., 'Zambia World Bank Education Project: Report on Preliminary Studies', prepared for the Government of the Republic of Zambia by Norconsult A.S. Consulting Engineers, Architects and Economists, Lusaka, March 1970, 1. Box Eaa-L0588 and Eaa-L0589, Series RA/S-6670/E/Ea.
18. The World Bank Group consisted of several organisations, including the IBRD and IDA. The IDA provided loans as grants, with longer terms and lower rates. At the time, Zambia's economy was evaluated as too strong to qualify for IDA credit. P. W. Jones, *World Bank Financing of Education: Lending, Learning and Development* (London: Routledge, 1992): 24.
19. John Trygve Lundeby, 'Bygg og vedlikehold i Afrika' (Construction and maintenance in Africa) (Master's diss., Oslo University, 2005), 27; Jones, *World Bank Financing,* 76.
20. World Bank, 'Project Performance Audit Report', 4.
21. 'Avslutningsdokument', 16 March 1982, Eaa-L0596.
22. Ole Bernt Frøshaug, *Utviklingshjelp i 25 år: 1962–1987* (Oslo: Departementet for utviklingshjelp, Informasjonsenheten, 1987), 5–7.
23. Norad, *Dette bør du vite om norsk u-hjelp* (This is what you should know about Norwegian aid) (Oslo: Norad, 1978), 8–17. For more on the 'official' principles, see 'Nordiska Rådet. Medlemsförslag. A 484/e', Box Xa-0010 Nordisk Samarbeids råd, in RA/S-6306/X/Xa, Departementet for utviklingshjelp archive.
24. Karl Otto Ellefsen, 'Countryside Reconstruction in Postcolonial Africa: The Ujamaa Experience', in *African Modernism and Its Afterlives*, ed. Nina Berre (Bristol: Intellect Books Ltd, 2022), 83, note 8.
25. Ibid. Also in Knut Gunnar Nustad, *Gavens makt: norsk utviklingshjelp som formynderskap* (The power of the gift: Norwegian development aid as guardianship) (Oslo: Pax, 2003), 56–57.
26. Nordiska Rådet, 'Medlemförslag om samberkan ved regionala project i utviklingsländerna' (Member proposals on cooperation in regional projects in developing countries), Sak A 28, 9:e sessionen 1961, Box Xa-0009, Series RA/S-6306/X/Xa.
27. NORAD, *Norden og Tanzania: Kibaha 10 år* (Oslo: NORAD, 1973); 'Nordisk felles bistand til utviklingslandene' (Nordic joint aid to developing countries), PG/ODB/ta23.11.71, Box Xa-0015, Series RA/S-6306/X/Xa.
28. Norad, *Zambia: et av Norges samarbeidsland i Afrika* (Zambia: one of Norway's partner countries in Africa) (Oslo: NORAD, 1979), 35.
29. Terje Tvedt, 'Det nasjonale godhetsregimet: om utviklingshjelp, fredspolitikk og det norske samfunn' (The national regime of goodness: on development aid, peace policy and Norwegian society), in *Det Norske samfunn* (The Norwegian Society), ed. Lars Alldén, Mariken Vaa, and Natalie Rogoff Ramsøy (Oslo: Gyldendal, 1986), 482–509.
30. Nina Witoszek, *The Origins of the 'Regime of Goodness': Remapping the Cultural History of Norway* (Oslo: Universitetsforl, 2011), 12.
31. Ibid., 13.
32. Lundeby, 'Bygg og vedlikehold', 29.
33. Lundeby's interview with Halvor Fossum on 11 September 2003, ibid.
34. Ibid. Halvor Fossum, a letter to Norad, 28 October 1968, Box Eaa-L0595.
35. Fossum, a letter to Norad, 28 October 1968, Box Eaa-L0595.
36. Meeting note no.3/69 from 21 April 1969, Box Eaa-L0595.
37. As Lundeby writes, at some point Norconsult was better informed about the project than NORAD, while Norconsult engineers entertained the Zambian delegation for the entire duration of their visit in November 1968. Lundeby, 'Bygg og vedlikehold', 30–31.
38. A letter from S.J.G. Burt, Chief, Division I Educational Projects Department (World Bank) to Mr. D. Mulaisho, Permanent Secretary, Ministry of Education, 5 June 1969, Box Eaa-L0595.
39. By 1967, Norconsult had projects in Ethiopia, Egypt, India, Tanzania, Nigeria, Irak, Peru, Jordan, Ivory Coast and Brazil. See *Innstilling om den videre utbygging av Norges bistand til utviklingslandene* (Recommendation on the further development of Norway's aid to the developing countries), Parliamentary Resolution no. 109, Ministry of Foreign Affairs, Oslo, 1966-67, 90–91.
40. Arne Askeland, an architect who worked for Norconsult, talked about his experience during the 1969 conference on the principles of Norwegian aid. See *Norge og u-hjelpen: konferanse på Elingaard drøfter prinsippene for norsk u-hjelp* (Norway and humanitarian aid: conference at Elingaard discusses the principles of Norwegian humanitarian aid)

(Oslo: Elingaard, Studieselskapet Samfunn og Næringsliv, 1969), 235–37.

41. Paal Bog, letter to Utenriksdepartement, 28 August 1969; 'Notat. Zambia/Verdensbanken, Konsulenthonorar', 5 September 1969, all in Folder 4, 'Avtalen Norge-Zambia', Box Eaa-L0596.
42. Note from Eldfrid Bjordal to department director Bog, 4 June 1969, Box Eaa-L0595.
43. Note from Bjordal to finance department, 25 April 1969, Box Eaa-L0595.
44. 'NORAD's comments to the Zambia World Bank Education Project Evaluation Report', Box Eaa-L0594; Republic of Zambia, Ministry of Education, 'Evaluation Report of Zambia World Bank Education Project', 1977, 51.
45. Letter from D.C. Mulaisho, Permanent Secretary, Ministry of Education to Norconsult, 16 June 1969, Box Eaa-L0595.
46. 'Report on Preliminary Studies', 5.
47. Jiat-Hwee Chang, *A Genealogy of Tropical Architecture: Colonial Networks, Nature and Technoscience* (London: Routledge, 2016), 11–12, https://doi.org/10.4324/9781315712680.
48. Ibid., 10–11; Arindam Dutta, 'Modern Architecture and the End of Empire by Mark Crinson' (review), *JSAH* 67, no. 2 (2008): 292–93.
49. Mishuana Goeman, 'From Place to Territories and Back Again: Centering Storied Land in the Discussion of Indigenous Nation-building', *International Journal of Critical Indigenous Studies* 1, no. 1 (2008): 1; Linda Knight, *Inefficient Mapping: A Protocol for Attuning to Phenomena* (New York: Punctum Books, 2021), 19, https://www.jstor.org/stable/j.ctv1wvncw2.4.
50. See a discussion by Torstein Ramberg, 'Arkitekt/Planlegger ansatt i bistandorganisationer', in Butenschøn and Bjønness, *Planlegging*, 213.
51. 'Report on Preliminary Studies', 26–28.
52. Evaluation Report, 1977, in 'Project Performance Audit Report', 120–21.
53. Ibid., 97.
54. See paragraphs 1.14, 7.01, 10.18 and 10.19 in 'Report on Preliminary Studies', 1970.
55. Evaluation Report, 1977, in 'Project Performance Audit Report', 56.
56. Bruno Latour, Steve Woolgar, *Laboratory Life: The Social Construction of Scientific Facts* (Princeton: University Press, 2013), 64.
57. 'Report on Preliminary Studies', 1970, 4.
58. 'Report on Preliminary Studies', 15; Evaluation Report, 1977, 105.
59. Norconsult booklet 'Zambia World Bank Education Project' in Butenschøn and Bjønness, *Planlegging*, 120–26.
60. Norconsult A.S., 'Report on Rigid Urethane Foam Sandwich', April 1979, Box Eea-L0591.
61. Kim De Raedt, 'Transnational Exchanges in Postcolonial Zambia: School Buildings at the Intersection of Architectural, Political and Economic Globalisation', in Berre, *African Modernism*, 104.
62. 1M, an abbreviated version of a planning decimetre was a standard Norwegian building module at the time, equal to 100 mm. It was adapted in the 1950s following extensive standardisation efforts, and used in the Nordic construction industry somewhat consistently throughout the 1960s.
63. 'Report on Preliminary Studies', 27.
64. Ibid., 24.
65. See, for example, an article on standardisation, export and global politics in the magazine of the Norwegian Engineers Association: Gudbrand Jenssen, 'Standardisering, eksportindustri og internasjonal politikk' (Standardisation, export industry and international politics), *Teknisk Ukeblad* (Technical Weekly) no. 23 (1965): 481–86.
66. Ibid.
67. See note 62. *Modul ABC* (Oslo: Norges Byggstandardiseringsråd, 1965).
68. 'Report on Preliminary Studies', 28
69. Ibid.
70. Ibid., 95.
71. Evaluation Report, 1977, 'Documentation of the project', 25.
72. 'Report on Preliminary Studies', 96–97.
73. Ibid, 93–97; also Butenschøn and Bjønness, *Planlegging*, 126.
74. 'Project Director's Report, Fourth Quarter of 1973', 5–6, Folder 08 'Årsmeldinger/Rapporter', Box Eaa-L0590.
75. 'Project Director's Report as per 31 December 1972', 6, Box Eaa-L0590.
76. 'Norad's comments to the Zambia World Bank Education Project Evaluation Report', 5, Box Eaa-L0594.
77. 'Project Director's Report for the Period 1 July to 30 September 1978', 5, Box Eaa-L0592.
78. *Nordisk Tidende*, 13 March 1975, 17, 19.
79. Ibid.
80. *Byggmestere* 38, no. 1 (1964): 9.
81. Hans Petter Sundh, *Klassifikasjon og koding av byggevarer* (Classification and coding of construction products), Research Report Project F-411 (Oslo: Norges byggforskningsinstitutt, 1967), 61.
82. See a critique from Swedish researchers Ejnar Wåhlin and Anne Plowden; in Sundh, 33.
83. Evaluation Report, 1977, 25.
84. Lars O. Silseth, 'Kommentarer til evalueringsrapport for Zambia World Bank Education Project' (Comments on Zambia World Bank Education Project Evaluation Report), 17 August 1977, 2; Box Eaa-L0594.
85. Evaluation Report, 1977, 25.
86. 'Report for Fourth Quarter of 1973', 'Problems Encountered', 4–5, Box Eaa-L0590.

87. Evaluation Report, 1977, 50.
88. On the handling of alterations, see *Teknisk Ukeblad* 116, no. 20 (1969): 618–20.
89. ‘Fourth Quarter of 1973’, 4–5, Box Eaa-L0590.
90. Ibid.
91. Evaluation Report, 1977, in ‘Project Performance Audit Report’, 96. In 1969, 90 per cent of steel products, 80 per cent of glass, 60 per cent of sanitary wares, 35 per cent of pipes and fittings, 25 per cent of timber came from South Africa.
92. Evaluation Report, 1977, 20–21.
93. See, for example, Taylor’s description of the final procurement of equipment, stranded at Dar-es-Salaam port, ‘a nightmare of congestion’. Norman Taylor, ‘Quarterly Report: For the period 1st April to 30th June 1978’, Lusaka, 30 June 1978, 6, Box Eaa-L0592.
94. ‘Progress Report for 1st Quarter 1974’, 1, Box Eaa-L0592.
95. See descriptions of the situations of Cohen & Co Ltd, Brunelli Construction Ltd, Prago Builders and ZECCO, and Energoprojekt: ‘Progress Report for the 2nd Quarter of 1976’, 1, Box Eaa-L0588; ‘Progress Report for 1st Quarter, 1975’, Box Eaa-L0590.
96. The furniture saga unravels in all progress reports from 1973 to 1978, and particularly in 1977 Evaluation Report that referred to it as a ‘scandal’, 54.
97. ‘Progress Report no. 1976/4; 31 December 1976’, 2, Box Eaa-L0592.
98. ‘Progress Report no. 1977/1; 31 March 1977’, 2, Box Eaa-L0592. ‘Progress Report no 1978/1; 1 January 1978 to 31 March 1978’, 1, Box Eaa-L0595. ‘Report on Rigid Urethane Foam Sandwich’, April 1979, Box Eea-L0591.
99. ‘Quarterly Report: For the period 1st April to 30th June 1978’, 2, Box Eaa-L0592.
100. A letter from Halvor Fossum to the Director of Buildings in Lusaka, 5 March 1974, Box Eaa-L0595.
101. ‘Final Report Prepared by Mr. Norman Taylor, Project Architect, August 1973 to August 1978’, 12–13, Box Eaa-L0592.
102. Ibid.
103. ‘Quarterly Report: For the period 1st April to 30th June 1978’, Box Eaa-L0592.
104. Dal, in Butenschøn and Bjønness, *Planlegging*, 129.
105. The Norwegian participants were senior architects F. Kruger-Johnsen, K. Utheim and construction economist from the Minsitry of Development Planning T. Kleven, architect Finn Bø commissioned by Norad contributed to some parts of the evaluation, Box Eaa-L0594.
106. See a Telex to Norad on September 29, 1980: ‘The report is not yet public in Zambia, and should continue this way’, loose papers Box Eaa-L0594.
107. Lasse Nymoen, ‘Referat’ on the debriefing of ‘Evaluation Report’ with T. Kleven, Eaa-L0594.
108. Evaluation Report, 1977, in ‘Project Performance Audit Report’, 101.
109. Ramberg in *Planlegging*, 213.
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Biography

Maryia Rusak is an ETH postdoctoral fellow (2022–24) at the Chair of the History and Theory of Urban Design of Tom Avermaete. Her postdoctoral project investigates the Nordic architecture of foreign aid in postcolonial Africa, focusing on the pragmatic economic rationale behind architectural production. Prior to joining gta in 2022, Maryia completed her PhD at the Oslo School of Architecture and Design. In her research, Maryia is particularly interested in histories of everyday objects, webs of bureaucratic institutions, obscure intricacies of architectural production, and generally, how buildings are made. Her recent research has explored postcolonial narratives across cultural and geographic divides. Rusak holds an MArch in Sustainable Urban Planning and Design from KTH, Stockholm, and a BA in Architecture from Princeton University.