



Fig. 1. The company's logo, fused letters 'UI' (*Urania Institut*, Urania Institute) and 'UV' (*Urania Verlag*, Urania Press) designed for them by an artist in Weimar, shows the care with which they cultivated their image. Or at least the explanation they produced for it does: the dot on the 'i', 'dark on the left, on the right, in the forward direction of the text, light, is intended as an expression of our confident hope in the spirit of the freedom song printed in the first issue of *Urania*: "Brightly from out of the dark past the future is now shining forth!"' From *Urania* 1: 5, 1925, 1.

Producing a Socialist Popular Science in the Weimar Republic by Nick Hopwood

Weimar Germany was marked by ambitious attempts to extend science and technology into everyday life under conditions of political crisis. The most fateful changes, the industrial rationalization drive and increasing surveillance of human reproduction, remain central to understanding why and how the Republic so disastrously collapsed. By the early 1930s, wide professional agreement on the need to reduce the 'burden' of 'less valuable lives' made it possible for the Nazis to radicalize these policies into programmes of extermination.¹ But there is no straight line from Weimar to the murderous practices of the 'Third Reich'. Science and technology were matters of intense public debate, and what happened was the outcome of struggles waged between different social groups on various fronts. Though a key participant in these struggles, the labour movement failed effectively to oppose either rationalization or the increase in scientific medical authority, and is often dismissed with the accusation that it was blinded by science. In this paper I re-examine the issue by analysing the work of a group of Weimar socialists who made science the focus of their political activity. We shall see that theirs was no bland and blind scientific faith, but a rich and contested culture.

The German Social Democratic Party, under the Kaiser the largest working-class party in the world, became in the aftermath of Germany's defeat the staunchest defender of the new Republic. It also finally split, so that the reformist SPD confronted the revolutionary German Communist Party (KPD). Socialists had long valued education highly, and ran their own libraries, schools, bookshops and presses. Further, in parallel to the party and the unions, and in opposition to bourgeois clubs and societies, organized workers and their allies had built a dense network of cultural organizations. These included clubs in which workers engaged regularly with science, where they built radio sets or promoted alternative medicine, went hiking or campaigned for free thought.²

Popular science, especially Darwinism, had been a major cultural phenomenon of the German Empire, and many who became socialists had replaced their faith in redemption in the next world with secular confidence in evolutionary progress to a better society in this one. Marxism itself had for this generation become a universal materialist synthesis that seamlessly explained natural and historical development.³ In view of this, it is often assumed that the left simply participated in a general and unremarkable, but also naïve and today rather embarrassing scientism. In fact, the pro-modern, pro-science stance on which socialists prided themselves was by no means a consensus. Despite the world renown of German natural sciences and all the achievements they could boast, they did not yet top the cultural pecking order and many of the educated middle class blamed them for destroying traditional values.

More subtly, Kurt Bayertz has argued that Marxist theoreticians distinguished themselves from bourgeois commentators in the ways they made science a weapon in, and considered it an object of, the political struggle. Socialists were confident that science, where rigorously pursued and free of bourgeois bias, would not just break the shackles of superstition, but would demonstrate the natural necessity of socialism. At the same time, they were critical of the condition of the natural sciences under bourgeois rule and claimed that in the socialist future the labour movement would take over and improve them beyond their wildest dreams.⁴ It is hard for us to recover what Jonathan Rée has called 'the red blood of the energetic creature which is now pickled in a bottle labelled reformist, Second International, evolutionary socialism'.⁵ But for many socialists, and not least the auto didact workers who spent their few leisure hours studying the popular Darwinism that was banned from the higher schools, science was politically important and incredibly exciting.

After the First World War, however, public interest in science fell, and many who had nurtured a positive image of scientific progress now associated the sciences with poison gas. Among the educated middle class, hostility to science was rife, and scientists felt a sharp loss of authority. Workers, too, borrowed fewer Darwinist tracts from libraries, and in adult education curricula the sciences lost ground to literature and the arts. By the

1920s, Darwinist popularizers like the best-selling Wilhelm Bölsche are reckoned by historian Alfred Kelly to have become 'an escape to the past, rather than a guide to the future', their optimism 'ill-adapted to a generation glutted on horrors and suffering', their 'great battles against church and school' in any case already won.⁶

At the same time, however, the labour movement played a crucial, though contradictory, role in organizing consent to massive technoscientific change. Socialist physicians, scientists and social workers were, for example, vocal contributors to debates over eugenics or racial hygiene, the science of breeding human populations, and some practised eugenic science and medicine themselves. Whilst many on the left vehemently opposed the blatant racism of much racial hygiene, and typically argued that it would be impossible to plan human reproduction humanely under capitalism, left professionals were sure that a 'people's eugenics' would feature in the socialist future.⁷ The capacity of the SPD to confront the Nazis had been seriously weakened by years of high unemployment, and socialists were surrounded by enemies on all sides.⁸ But it was also because of their own commitments that socialists were unable to resist; and in some cases collaborated in, practices that would tragically turn their vision of emancipation through scientific enlightenment into its opposite.⁹

We cannot adequately explain this tragedy simply by invoking socialist faith in science and pointing to its huge prestige among socialists under the Empire, not least because images of science were now tarnished. It is neither sufficient to analyse the statements of prominent socialist professionals, nor to restrict our attention to eugenics, even if this is what we ultimately want to understand. New work on the history of popular science can help us write a richer history by supplying a dimension that has been missing even from differentiated recent analyses of Weimar science, medicine and technology. This goes well beyond demolishing received notions of scientific 'popularization' as a semi-automatic process of diffusion down a gradient of truth. It shows scientific authority as a fragile achievement, always open to challenge and always needing to be explained. It is concerned with the popular production and reproduction of science and other forms of natural knowledge in order to investigate complex webs of cooperation, resistance and appropriation. And, most challenging of all, the new historians of popular science are aware that the history of 'the popularization of science' is itself a problematic historical product.¹⁰ This work encourages us to see that everything about scientific communication was potentially and often actually contested: not just what was being purveyed, but who was doing it, how, for whom, where and why. Applied to the problem of Weimar science and socialism, it helps us to recover from taken-for-granted assumptions the complexity and contestedness of this scientific culture.

Workers in the Weimar Republic came across science in medical encounters, on the radio and in confrontations with the science of work. It is often forgotten, however, that the labour movement not only represented

organized workers, its institutions were also a key battleground for their hearts and minds. My subjects are a coalition of socialist cultural producers for whom science was crucially important even in the last years of the Republic. They worked to counter loss of interest in, and increased hostility towards science in the heart of the old labour-movement culture. Their cultural battles were far from won, and science – of an appropriate kind – was to be a key weapon in fighting them. I focus on the production of *Urania*, a magazine that circulated in about 25 000 copies between 1924 and 1933, when it was closed down by the Nazis.¹¹ Magazines organize and represent constituencies, but concentrating on one magazine can be misleading; it is often an inadequate way to find out what those involved actually did when they were not writing or reading it. I try, though, to make a virtue of this vice by investigating the culture of the magazine itself, the work of producing *Urania*.

I interpret ‘production’ widely, that is, I analyse several of the stages of *Urania*’s ‘communications circuit’.¹² I examine the work of authors and editorial staff in the party press where the magazine was made, showing how they sought to resist far-reaching challenges to their authority. I follow *Urania* out of the press, so that we can see how its distribution in the socialist cultural organizations defined audiences and loaded the magazine with meaning. Comparing *Urania* to its ‘bourgeois’ competitor *Kosmos*, I ask what the ‘socialist science’ that *Urania* claimed to produce actually was, and show how it was sold as the basis for far-reaching reform of readers’ lives. This was not just a last blast of the old popular Darwinism. *Urania*’s producers reasserted the centrality of science to making ‘new people’, proletarians liberated from the unholy alliance of church and capital by scientific free thought, Marxism, sexual enlightenment, ‘social hiking’ and naked gymnastics. But readers did not just read as they were told. In a complex process of engagement, appropriation and disappointment they participated in producing this culture of science.

THE ‘PROLETARIAN KOSMOS’ CLAIMS A TRADITION

Urania was produced in Jena, a town that owed much of its reputation and livelihood to science. The university had been home to zoologist Ernst Haeckel, who made it the bastion of German Darwinism in the half century before World War I, and its economy was increasingly dominated by the Carl Zeiss optical and precision-engineering firm, which produced high-quality microscopes and planetaria, and promoted the scientific education of its workers.¹³ *Urania* was made here too, but it was a product of political polarization in the revolutionary crisis that followed Germany’s defeat in the Great War, and the magazine sought to appropriate for the left the town’s traditions of science as world view and productive force.

Jena was the university town of Thuringia, the central German state

that, with neighbouring Saxony, had the highest concentration of social democrats and the most active cultural organizations in the country. They were bastions of the left wing, which rejected the party leadership's coalitions to the right, insisting on 'class struggle' and cultural confrontation. In the early years of the Republic, regional socialist governments in Saxony and Thuringia pursued radical and anti-clerical educational reform. But their policies united against them the bourgeois parties and their own Berlin leadership, who in late 1923 supported the army's quashing of the coalitions they had just formed with the communists. In the elections of February 1924, the Thuringian SPD lost its key parliamentary position, and the state, which had never been as solidly socialist as 'red' Saxony, fell into the hands of the right. By 1930 the first Nazi minister in Germany was in power here. The stakes, then, could not have been higher as the newly defeated socialist cultural politicians sought to regain their dominant position by first consolidating within the social-democratic milieu the islands of authentically socialist culture that they had failed to realize in these states as a whole.¹⁴

The SPD-left has been presented as formulating its cultural aspirations principally in *Kulturwille* ('Will to Culture'), a journal devoted to socialist cultural policies and forms in the arts. But the hitherto neglected *Urania* became an important and complementary forum for left-wing socialists, its purpose to bring science and technology into the cultural struggle. *Urania* began by disputing the legitimacy of those bourgeois organizations already purveying science to organized workers, going into competition with *Kosmos*, the most successful popular-science magazine in Germany this century.¹⁵

Kosmos aspired to be 'a mediator between the self-sufficiency of scholarly diligence and the thirst for knowledge of the general public', purporting to benefit both scientists and the audience for science. It would prevent science from 'alienat[ing] itself from the living feeling of the people', and show it off to its best advantage: 'the precious stones of scientific truth' were to be 'embedded in a sea of natural-scientific knowledge from all times and parts of the world'.¹⁶ Its readers, as Germans, would have the strength to raise themselves above 'the struggle for earthly goods' and enjoy 'the pure heights of nature and science'.¹⁷ Actually, *Kosmos*' support for Darwinism and educational reform had got it banned from some teacher-training colleges, and led the German Red Cross to consider it unsuitable reading for wounded soldiers in the First World War. But, for the socialist freethinkers of Thuringia in 1924, there were no limits to partisanship any more: science, like everything else, was to be rejected unless it came from the socialist camp. So they copied the *Kosmos* formula of a monthly magazine with four book supplements a year, but redefined scope and content for a socialist audience. Their 'proletarian *Kosmos*' was to bring its readers not just natural knowledge, but also knowledge of society, from a Marxist standpoint.¹⁸

Urania took its format from one bourgeois institution; it called itself after another. Ernst Mühlbach, the first editor of the magazine and a teacher

previously active in adult education in the Rhineland, took the name of the Greek muse of astronomy from the organizations started in Berlin in 1888, which had become synonymous with science popularization by lectures and demonstrations.¹⁹ This appropriation deliberately claimed a tradition, which the magazine presented enterprises that popularized only 'as bourgeois-capitalist society can take it' as having betrayed. This was a standard theme of socialist cultural politics, but it was also a radical departure: the newcomer explicitly rejected the Vienna *Urania*, which had been founded in imitation of the Berlin institution, and to which Austrian social democrats had been (and largely remained) quite happy to leave the natural-scientific education of their members.²⁰

URANIA IN SOCIALIST CULTURE

Convinced of the truth, true to their conviction and determined to act, researchers, journalists, publishers, printers, agents of the *Urania* have come together to carry out adult education with a purpose, to be the friend and adviser of the masses. Comrades in the struggle! We call to you: learn, keep helping us, act!²¹

Urania mediated between leading cultural producers and active members of the workers' cultural organizations. Those who wrote for the magazine were cultural politicians and senior functionaries, but also intellectuals who identified more or less closely with the labour movement. Most prominently, the authors included Haeckel's last pupil, Julius Schaxel, an increasingly left-wing social democrat who was determined to carve out a niche for progressive scientists in the cultural activities of the labour movement.²² He was joined by other left scientists such as biologist Paul Kammerer, Haeckel's biographer Heinrich Schmidt and statistician Emil Julius Gumbel; freethinkers like Max Hermann Baege and Theodor Hartwig; progressive physicians, especially sex reformer Max Hodann; teachers and educationalists, particularly the leading pedagogue of the SPD-left and outspoken freethinker, Anna Siemsen; science writers including Hermann Drechsler; and a host of luminaries from the educational and cultural organizations of German and Austrian social democracy (the likes of Georg Engelbert Graf, Helmut Wagner and Karl August Wittfogel).

The authors aimed to reach those organized workers and educators who cultivated scientific knowledge in their leisure hours, targeting two organizations in particular: the socialist ramblers and the 'proletarian' freethinkers. The Tourist Club '*Die Naturfreunde*' ('The Friends of Nature') was the socialist hiking organization, founded in Vienna in 1895 to make it possible for industrial workers to take part in the outdoor sport from which the bourgeois alpine clubs excluded them. By the time *Urania* appeared, the *Naturfreunde* had about 84 000 members in Germany. Most were workers of higher status, metalworkers or printworkers, or in white-collar jobs. These

labour aristocrats often understood themselves as an intellectual elite and were probably the major working-class consumers of natural science in the form of lectures, magazines and books. They had, by the low standards of the labour movement, a high level of women's participation, but this was a 'family leisure organization' in which patriarchal practices persisted. Like the Socialist Workers' Youth (*Sozialistische Arbeiterjugend*, SAJ; the youth wing of the SPD), another important audience for *Urania*, the *Naturfreunde* effectively mediated between bourgeois lifestyle reform and the labour movement. As Jochen Zimmer has put it, the hikers certainly weren't *all* mountaineering, teetotal, vegetarian, freethinking, esperanto-speaking naturists, but neither were such figures exceptional caricatures. Because of this, many of their erstwhile comrades in the unions and the parties of the left considered them cranks.²³

The proletarian freethinkers also counted themselves a cultural and intellectual vanguard. Organized free thought had begun in the late nineteenth century among intellectual reformers who deployed science against especially the Catholic Church. Proletarian organizations were founded in the early twentieth century, the most ideologically active one in Thuringia in 1908; the other main one began as a cremation insurance association in Berlin, but in the mid-1920s took on the propagation of atheism. Tiny before the First World War, in the Weimar Republic they rapidly became one of the largest ancillary organizations of the parties of the left. Most of the 600 000 members of the German Freethinkers' Association, which had formed from the merger of the two largest organizations, had probably joined primarily in order to take advantage of their cremation services. However, a thin but active layer of functionaries devoted themselves to the cultural struggle.

Against the bourgeois freethinkers they insisted that only socialism could overcome a religion that was thoroughly entangled with state churches and bourgeois rule. Some, though, worked together with, for example, the smaller Monist League, which though 'bourgeois' leant during the Weimar Republic to the left. Against the indifference or downright hostility of the SPD the proletarian freethinkers argued that Marxists must be atheists, and that anti-religious propaganda would lead workers to socialism. But the freethinkers, like the *Naturfreunde*, were often barely tolerated by the national leadership of the SPD, which judged their activities at best a distraction. (In the later years of the Republic, the KPD assigned the freethinkers an important role in the ideological struggle, but one that was strictly subordinate to the aims of the party, and mostly consisted in splitting the movement.) Religious socialism was a recent development in Germany, but in Prussia the SPD was in permanent coalition with the Catholic Centre Party and also feared the loss of Catholic votes in the Rhineland and the South. In the Saxon and Thuringian strongholds of the SPD-left, however, free thought was part and parcel of socialist politics. Catholicism was without influence here, the socialist milieu was strongly opposed to the

evangelical state churches, and secularization of education had been an important aim of the socialist regional governments of the early twenties. In Thuringia the proletarian freethinkers had in 1923 been granted the same status as the churches, and free thought continued to be taken for granted in socialist cultural politics in a way that would have been unthinkable in Prussia. It was certainly no coincidence that a magazine that pushed an atheist and scientific world-view as the central element of the new socialist culture should have been produced here.²⁴

The first issue of *Urania* was produced by the Urania Press in October 1924 as a regular publication of the Urania Free Educational Institute: the magazine, press and institute made up the 'Jena Urania'. Remarkably, *Urania* achieved an international circulation of nearly 25 000 in its first quarter of publication, peaking at perhaps 28 000.²⁵ This was possible only because the Urania Press was a daughter enterprise of the Thuringian Press and Printers (*Thüringer Verlagsanstalt und Druckerei*, TVD), one of the largest and most modern party presses in the country, which employed more than 100 people and had a turnover in 1929 in excess of 600 000 marks. Founded in 1906, the backbone of its business was *Das Volk* ('The People'), the SPD daily for Jena and nearby Weimar, but it also produced books and did demanding contract work for other institutions such as the modernist architects of the Bauhaus.²⁶

From its inception, *Urania* was as much an economic proposition as an ideological one. The then attorney of the press, Otto Gottschalg, recalled how the magazine was set up.

It must have been in the first half of the year 1924 when . . . a Comrade Ernst Mühlbach was led into my office. . . . Comrade Mühlbach presented his idea to me of founding a competitor magazine to *Kosmos* . . . [which] had a large circulation, especially within the international *Naturfreunde* movement. *Kosmos*, though, treated a theme abstractly . . . Comrade Mühlbach's idea was to bring the abstract natural-scientific theme into connection with human society. . . .

I saw in his suggestion two things:

1. the satisfaction of a need that actually was present among intelligent workers, which also lay in the interest of the party,
2. a running nice printing contract for our party press. . . .

So I presented Comrade Mühlbach's idea to the manager Comrade Georg Pfeuffer. Comrade Pfeuffer saw above all the printing contract and agreed.²⁷

In Gottschalg's account, *Urania* existed because the manager approved a scheme to keep his presses running. And his decision was shrewd, for if the TVD made *Urania* possible, *Urania* for its part helped fund the expansion of the company: in 1925 it could afford machines to do its own binding rather than having this done in Leipzig.²⁸



Fig. 2. 'A souvenir of my 21st birthday, 1929'. Office staff of the Urania Press celebrating with Helene Müller, section manager of the magazine dispatch department (from left to right): Martha Strebung, Walter Remme, Helene Lange (*Urania* subscriptions), Else Stern, Aribert Haberlag (legally responsible for content and ads), Helene Müller (sitting), Hilde Schönduwe (*Urania* subscriptions), Walter Federbusch (manager), Vera Schneider (?), Walter Knüpfer (book dispatch), Lotte Garbe (shorthand typist). Significantly, women predominate in the less senior clerical positions, and no authors are present. Photo generously provided by Helene John (née Müller); identifications by Helene Lange and Gerda Groll.

The Urania Press took the distribution of its products extremely seriously, because it was selling magazines that filled the party coffers and spread the word. Historians can learn a good deal by paying distribution as much attention, for this was a crucial and distinctive part of *Urania's* path from author to reader. Only by following the magazine as it was transported out of the press to the places where its meanings were made in the uses to which it was put can we appreciate how it became part of the currency of cultural exchange.

The TVD set up a special section to handle subscriptions, advertisements and mailing;²⁹ some of the office staff are shown in Fig. 2. The company used its contacts in the *Naturfreunde* and other organizations to create a market for the first issue by recruiting the people who would carry the local publicity and distribution. For unlike some magazines, *Urania* did not live primarily from block organizational subscriptions, though it was eventually distributed in part through the publishing companies of the *Naturfreunde*, freethinkers and SAJ. Some people subscribed individually, but the key to

the magazine's success was the network of agents (*Vertrauensleute*) it persuaded to advertise *Urania* at work, among their friends, and in the meetings of left groups.³⁰

One such person was Max Kessler, who in mid-1924 was a trainee clerk in the town hall in Kahla near Jena. He was excited by the new venture, by its 'fresh tone' and because it 'tackled topics that weren't dealt with anywhere else', and signed up workers at the local porcelain factory. (He soon moved to Jena, where he was active in the SAJ, to take a book-keeper's job in the TVD.)³¹ *Urania* grew so fast, and kept going through the economic crisis, because it could rely on this network of committed local advertisers, whose work it encouraged in every possible way; it even lent out a set of a dozen promotional slides, with instructions to introduce them into slide evenings and hand out order forms while they were showing.³²

Successful marketing and distribution made *Urania* integral to the education of *Naturfreunde*, freethinkers and social-democratic youth; *Urania* publications feature in reminiscences as a regular stimulus to communication. For example, Kurt Meister remembered, as a freethinker and chairman of the local branch of the SAJ in his Thuringian village, getting *Urania* from a little bookshop in nearby Rositz, through which he had previously taken *Kosmos*. In the village lived an old teacher, who would borrow *Urania* books or the magazine from Meister, and then give lectures based on what he had read. Fritz Barth, who came to Jena as cultural secretary of the district German Freethinkers' Association, recalled the collective reception of *Urania* publications:

When we were on hikes or travelled to youth meetings we generally had the *Urania* and other new books in our rucksacks. And in the youth hostel songs were sung, but there was also discussion of books and new magazine articles. They were mostly written in such a way that we could read them, but also that there was discussion and some things became much more understandable. And the discussions were also the precondition that we could use this new knowledge in discussions after lectures.

Barth and his comrades took what *Urania* offered them and worked it into a form that they could use for themselves.³³

Urania publications surely mattered most in these rather informal settings in which they were part of the everyday cultivation of knowledge, but they also featured prominently on special occasions. Books generally circulated in the labour movement as appropriate and inexpensive gifts; the *Urania* and other publishers always had special sales drives at Christmas. But some gifts were more important even than Christmas presents. The freethinkers promoted a secular confirmation, the *Jugendweihe*, in which rather than being admitted to the community of Christ, they welcomed the young adult in a mass school-leaving ceremony into the serried ranks of the organized working class. The high point of the proceedings was a speech,

which ended with the gift to each child of a small but improving book. Several Urania books were given in this way; Schaxel wrote one called 'People of the Future' specially for the *Jugendweihe*, and Urania published it outside their regular schedule to appear in early 1929, just in time for that year's round.³⁴

The *Jugendweihe* is a graphic example of the labour lavished on the distribution of Urania publications; the actions in the first few months of 1933 of those who had become the company's main opponents bear grim witness to the importance to taking books as physical objects seriously. In that year the Urania lost its cultural struggle, and as the Nazis crushed the labour movement, they forcibly prevented the company from producing and distributing magazines and books. On 21 April 1933 the Jena police confiscated from the TVD 500 copies of Schaxel's book, which they destroyed for 'bringing religion and the institutions of the church into contempt'. The company was dissolved soon after.³⁵

ORGANIZED WORKERS, SOCIALIST EDUCATORS AND 'BOURGEOIS SCIENCE'

What does the Urania want? To communicate knowledge of nature and society. But science too is determined by class! Only the Marxist can discover the economic and social driving forces behind the theories and ideologies of each epoch.³⁶

Urania was a forum in which leading functionaries debated the activities and problems of the socialist cultural organizations, and socialist professionals discussed how readers should respond to what was happening in the universities, in medicine, in industry, and in the world at large. This wide range of topics was organized around a broad view of science, and the magazine's stance on science was defined principally by Julius Schaxel, who as chairman of the Free Educational Institute for the duration of its existence and from November 1927 scientific director of the magazine, gave *Urania* its profile. Though a highly unrepresentative figure – he had both the highest academic status and was among the most left-wing authors – for many he set the tone and agenda, and the way he placed himself was also the way he positioned *Urania*.

We cannot appreciate the task that faced Schaxel in writing programmatic statements for the magazine unless we abandon any idea that members of the labour movement were of one, positive mind about science and scientists. The following exchange in the journal of the *Naturfreunde* in Berlin-Brandenburg shows that members articulately and passionately contested not just the validity and usefulness of scientific knowledge, but also the trustworthiness of its producers. Curt Kröber called for more *Naturfreunde* to cultivate natural science, because 'Our whole life is based on applied science.'

Since, however, the time for only too many applications has not yet come [*nicht kulturreif sind*] and we want to and must change things, it is also our duty to know all the fundamental principles of life. What I do not know, I cannot change. It is not necessary to invent everything again; this would not help us either. We also do not need to work with the dissecting knife, or draft drawings of bridge buildings. . . . We must, however, allow ourselves to achieve command of everything in consciousness [*bewußtseinsmächtig werden*], in order to be able to think on a larger scale, more universally. – Now . . . I would just like to give a small tip: get yourself a dictionary of foreign words and guard against the insidious poison of denial; for only strong affirmation of cultural activities will lead us to prosperity for all.

When he read this, Georg Brunner was incandescent:

Science! A high and sublime word for so many, but hardly anyone knows what he should understand by it. And so you leave it to others to claim 'science' for themselves. Generally the worker takes a passive or distrustful attitude to doctors [*Doktoren*] and professors, colleges and universities. He does not believe in 'cultivation' [*Bildung*] or in 'science', he knows from his own life and from his work that real knowledge is cultivated in other places than these institutions.

And he is right! Because this science is not noble, . . . it is dry pseudo-knowledge, book-learning and, not least – it can be bought for money, like a prostitute. That is why not just individuals, but great, thinking strata have an attitude of rejection towards the representatives of such 'science'. But too little, much too little do we rouse ourselves to struggle against traditions that today have no point any more. Example: General Ludendorff – honorary doctor! Scientifically based reports prove convincingly that – etc. etc.

Where was the shrill laughter of the people at this mockery? Nothing. Only science still glows with the splendour of celestial wisdom.

'This science', wrote Brunner, 'let us not hesitate to deny.'³⁷

This is an unusual exchange from the turbulent period of possibility that followed Germany's defeat. The situation had stabilized by the time *Urania* appeared, but readers will not have entirely forgotten the heady debates of just two years before. Brunner felt himself beleaguered, but his position was clear: he did not trust academic peddlers of science, and refused their meretricious wares. Erich von Ludendorff, the arch-reactionary former head of Supreme Army Command, might have been an easy target; attacking scientific reports went rather closer to the bone. But in some respects Kröber's contribution is the more remarkable. He doubted that it was necessary for socialists to carry out their own dissections, but he actually considered the extraordinary option of establishing a corps of worker-

anatomists. It is important to read Schaxel's position pieces against these, because when he proclaimed that 'science too is determined by class', it was in such debates that he was effectively intervening.³⁸

Schaxel explained that the bourgeoisie, which developed science as a weapon in its struggle against feudalism, had taken fright at the threat from the organized working class. 'Bourgeois science' was now a chaotic mess, its practitioners prey to all kinds of mysticism and irrationalism. They no longer dared to look the truth in the face, but had to hide it from themselves and from the workers. Whilst the rising bourgeoisie had rejected religion and waved high the banner of free thought, that, as Engels had put it, had been quietly dropped, just as the cheeky boy who got more and more seasick had had to give up the cigar with which he had proudly swaggered on board ship.³⁹ The science of the bourgeoisie had come up against the social limits of knowledge: its social position no longer allowed it to recognize the reality of either society or nature. Scientists as the functionaries of the bourgeois class could not afford to draw conclusions from the huge pile of facts they had amassed, but took refuge in a spirit-world.

By contrast, in the socialist society of the future there would be a 'socialist science', finally freed from the bonds of class. Only the proletariat could fight and win the battle for socialism, but first proletarians must learn from science to recognize their own position in nature and society and take the appropriate action. So far only a minority had done this, because the dying bourgeoisie was not just itself unable to face reality, but invested a good deal of effort in preventing the members of the proletariat – the only class capable of development – from carrying out their historic mission.

Schaxel defined 'socialist', or occasionally 'proletarian', science negatively against the 'capitalist' or 'bourgeois' science that he knew in Germany, and positively on the model of the Soviet Union.⁴⁰ But though he insisted on the language of class, when describing 'bourgeois science' Schaxel generally spoke of 'limits', 'barriers' and 'chains', and referred to socialist science as 'free' to 'unfold'. The rhetoric of class determination sits uneasily with these images of science developing autonomously with various degrees of freedom. Professor Schaxel's talk of class needs interrogation, for he certainly did not mean that the bourgeois produced bourgeois science, and the proletarian, proletarian science. In fact, continual rhetorical slippage between science determined by class and science merely braked by reaction served to negotiate the paradox that in *Urania* bourgeois socialists claimed the lead in producing a 'proletarian' science.⁴¹

Schaxel concentrated on convincing his audience that science in the German universities was indeed bourgeois, but combined this with the crucial legitimacy argument, that the science of the bourgeoisie, though in a parlous state, was on no account to be rejected wholesale. To consign bourgeois culture to the flames would be short-sighted and soon untenable, 'for the culture of the class that leaves the battlefield beaten must . . . be taken over as our historical heritage and developed further.' Schaxel had

reason to worry, because some organized workers did reject 'bourgeois science' lock, stock and barrel. So he rehearsed the arguments that Lenin and Trotsky had developed against the Soviet 'Proletkult' movement, invoking the authority of 'no other practitioner than Lenin' discussing 'none other than the theoretician Marx'. Lenin had shown that it was Marx's thorough study of the knowledge achieved under capitalism that had enabled him to derive 'the laws of development of human society' and 'to grasp the inevitability of the development of capitalism into communism'. And most importantly, 'he proved this only . . . with the help of the most complete appropriation of everything that earlier science produced!'⁴²

In the same way, Schaxel argued, only that minority of scientists and educators who had made common cause with the class-conscious proletariat could render serviceable the natural science of the bourgeoisie. *Urania* presented the universities as the field of a manichaeian struggle between an army of reactionary professors and a few lone socialist snipers. It vilified racist, monarchist professors like Haeckel's successor in Jena, the appalling Ludwig Plate, but made socialist scientists into heroes. These honorary proletarians were to link the old order and the new, taking on their own class at its own game, and showing their adopted class the rules of the new one. (There are heavy overtones of masculine sexual bravado here: if the bourgeoisie's lost cigar symbolized its epistemological impotence, these sex therapists of knowledge reckoned they could show the proletariat how to penetrate reality.) These 'red professors' were the 'more experienced personnel', charged with 'sifting and filtering' the cultural heritage for the 'fighting knowledge' (*Kampfeswissen*) that the proletariat could use in its struggle.⁴³ And this was the basis of *Urania's* hoped-for alliance between its working-class readers and the dissident members of the bureaucratic and technical intelligentsia who wrote for the magazine. If successful, their critical appropriation of 'bourgeois science' would drive out other stances towards official learning: reverence and indifference, but also Brunner's unconditional rejection in favour of other ways of knowing.

'SOCIALIST SCIENCE'

Schaxel's rhetorical appeals were important, but how did *Urania's* project play out in articles on specific topics? A few scientific controversies were crude political litmus tests, and many articles accordingly pushed materialism, insisted that scientific explanations were possible, or took on right-wing theories of race. But the value of simply lining up the positions of socialists and their opponents on particular issues is limited. Even outside the academy scientific and political fronts often did not coincide, and many scientific theories were not in fact clearly politically coded. But in spite of this, there were important, if limited, differences between the ways in which the politically adjacent *Urania* and *Kosmos* produced natural science for their audiences. I have selected a pair of articles on the same topic from the

two magazines. They are not 'representative'. I have chosen from *Urania* an article that, though not on a particularly sensitive topic, is obviously politicized, because it allows me to point out most clearly not just the distinctiveness, but also the limits of 'socialist science'.

Schaxel reckoned workers' recognition of reality was being hampered by the mystifying spiritual, religious, or idealist theories peddled by those obvious agents of stupefaction, the schools and the churches. But his critique was more far-reaching, and explained why even apparently well-meaning bourgeois enterprises such as *Kosmos* had a disastrous effect on the worker's striving for a clear picture of the world:

The rich store of the details of accumulated knowledge is of no use to the proletarian in carrying out his social task, even if he is given it as a present. On the contrary, the consolation of religions, philosophies and *Weltanschauungen* just clouds his view of the real goal. Technology enslaves the worker, philosophy puts him to sleep, the diversity of the sciences dazes him or at least distracts him from gaining his own position.⁴⁴

The problem with 'bourgeois science' was not just particular, objectionable theories, but that its contradictory jumble of concepts was popularized at random. And sure enough, the article I shall discuss, Dr Hans Braun on 'Serodiagnosis of Plants',⁴⁵ was followed by a medley of pieces on the baobab tree, giraffe evolution, the structure of stars, and Spanish deserts. This was what *Urania* lampooned as 'diversionary science' (*Ablenkungswissenschaft*).

Urania sought to distinguish itself from *Kosmos* by its clear programme, which it defined by setting a frame. Dr Hugo Iltis' article on 'Blood Relationship in the Plant Kingdom', with which I shall compare Braun's piece, appeared in the October 1925 issue of *Urania*.⁴⁶ In the same number were Schaxel's 'What Does the Urania Want?', which laid out the programme I analysed in the previous section, and articles on 'Physical Training and Class Struggle', 'The Mechanics of Thinking' and 'What Everyone Should Know about the Theory of Evolution'. These were all focused and mutually reinforcing pieces.

There was, however, much more to *Urania*'s framing than this. The whole magazine announced its commitment, the main text finishing with the Danish socialist march, 'We Are Bound by Love, We Are Bound by Need', and its ads mostly puffing socialist publications and clubs. More subtly, whilst *Kosmos* still used Gothic print, *Urania* had just introduced roman type. Embracing the new functionalism would soon allow it a greater variety of fonts and styles, and gave the magazine a more open and modern look: even in its typeface *Urania* was more unequivocally for progress, modernity and internationalism than its traditional competitor (Fig. 3). It was not about slipping a bit of socialism into a comfortable bourgeois format, but



Fig. 3. Left. Cover of *Kosmos* for August 1926. Right. Cover of *Urania* for September 1927; note up the left-hand-side the 'Preis-Ausschreiben', a competition in which 1000 marks in cash and book prizes were to be won for recruiting new subscribers.

used an uncompromising design to define its science as socialist. *Urania* increasingly deployed large and striking photographs or clear and expressive drawings. *Kosmos*, by contrast, appeared even in its visual style to shy away from reality: it carried fewer photos, making heavy use of rather whimsical paintings, which reached their apotheosis in the lurid colour reproductions it introduced in 1928.

In the first sentence of his *Urania* article Hugo Iltis recalled that the success of Darwin's theory of evolution was due 'in no small part' to the then revolutionary spirit of the bourgeoisie. But 'since that time', he argued, 'much has changed. The bourgeoisie, the rebel of the nineteenth, has become the tyrant of the twentieth century. We should not be surprised if it changes its ideologies.' This explained how Darwinism could have entered a so-called 'crisis', despite the fact that few theories were sustained by so much evidence. Iltis' article reported new experimental support. At the last meeting of the German Society of Naturalists and Physicians in Innsbruck there had been

a great sensation, of course, one hardly noticed by the masses of participants. In the botanical section the *Königsberg* professor *Carl Mez* lectured on his *serodiagnostic investigations*. – For a socialist it is a strange milieu. In the lecture hall hangs – in the Austrian Republic – the picture of

the last Habsburg but one. Outside in the street formations of the *Stahlhelm* [nationalist paramilitaries] march with fife and drum. And on the podium stands the speaker, probably like most of the listeners a conservative, and reports the splendid new proofs that in more than ten years' work with his students he has made of the revolutionary theory of natural development.

Reactionary scientists were not to be trusted, but, in a favourite trope, they were often forced to speak the truth 'by the weight of the facts'.

Iltis briefly introduced the principle and some applications of 'serodiagnosis'. He explained that the blood serum of an experimental animal reacted to the blood, or just the protein, of another species by forming chemical bodies that caused precipitations. These reactions were species-specific, and this was the basis of the most famous application of the technique: in forensic medicine, serum against human blood distinguished it from animal blood. Even better, the blood of anthropoid apes had produced quite a strong precipitation, 'not only *incontrovertible proof of the blood relationship* – in the truest sense – *between apes and humans*, but also a splendid method for determining family relationships between different living beings.'

Sera could also be made against plant proteins, and these Mez had used to determine evolutionary relationships among plants. Iltis discussed the results in some detail, but put the take-home message there for all to see in a full-page 'hypothetical evolutionary tree of the plant kingdom' (Fig. 4). His illustration reinforced what was also his parting shot:

The theory of natural development . . . receives with the work of the Königsberger a new support and further extension. The main argument of the conservatives: 'It has always been this way and it will remain so' – loses any validity in the face of the conclusive victory of the concept of development. 'The world was different and it will become different.'

Dr Braun started his *Kosmos* article by explaining, without further ado, the principles of serodiagnosis. He mentioned the forensic application and the demonstration 'of great importance for the theory of evolution' of the relationship between the blood of humans and apes. 'On the other hand', he added, it had recently proved possible 'to distinguish the white race from the black'. He protested that he would explain the technique briefly, but still detailed the preparation of the various reagents, and chose as his only illustration, not a great evolutionary tree, but a small photo of test tubes containing the products of different kinds of reaction (Fig. 5). Though conceding 'the importance of the Königsberg research', Braun was cautious about Mez' work, claiming that, 'it has, of course, not yet met general acceptance; supporters and opponents face each other in a heated struggle'. Braun's applications of serodiagnosis were confined to systematic botany and agriculture. He described in some detail how the technique could be

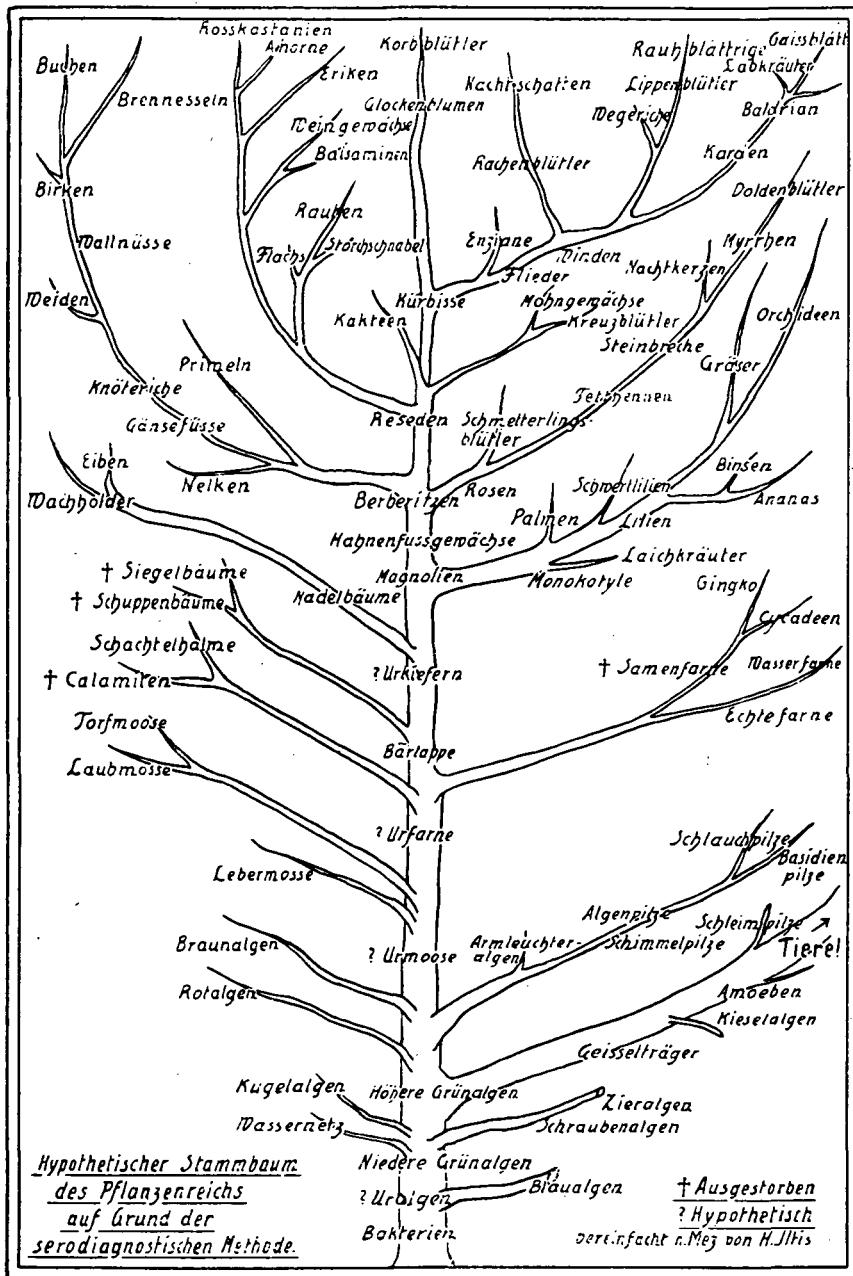


Fig. 4. 'Hypothetical Evolutionary Tree of the Plant Kingdom on the Basis of the Serodiagnostic Method', 'simplified by Hugo Iltis after Carl Mez' (†, extinct; ?, hypothetical). From Iltis, 'Blutsverwandschaft', p. 9.

used to distinguish varieties and calculate the proportion of impurities in wheat flour, drawing his readers into the nitty-gritty of these determinations with two tables of numbers showing calibration and use of a serum. He concluded, 'Much has been achieved, but what has been achieved obliges us not to be content with it, but continually to make our way forward, to develop it and to find new goals.'

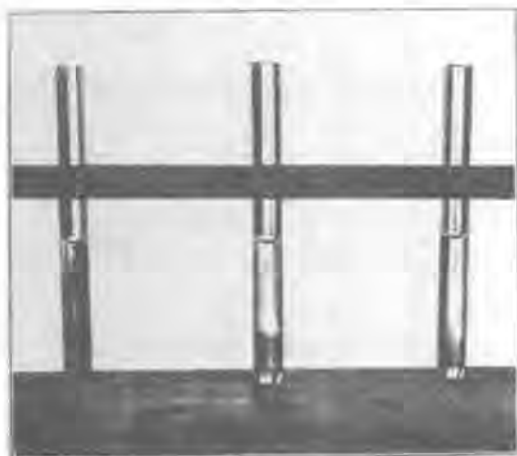


Fig. 5. 'Precipitation Experiment. a, no precipitation: anti-substances and antigens of different species; b and c, precipitation: anti-substances and antigens of the same species.' From Braun, 'Serodiagnostik', p. 291.

Whereas Iltis enlisted the latest research to support further a big, embattled and ideologically central truth, for Braun the theory of evolution, true but old hat, was just one element in the background knowledge he assumed. Iltis' article is tightly focused, framed and punctuated by statements of political intent; he introduced the detailed presentation with a dramatic anecdote, placing himself as a socialist agent going into the enemy camp to bring back the ideological dynamite his opponents did not even realize they had made. Braun's drier piece is organized around the technique, it lacks overt political declarations and he himself does not appear. But his tacit denial of politics was in fact his greatest political weapon, for it made serodiagnosis and its uses into things his readers could just keep on taking an interest in from time to time. Iltis put politics up-front, and science underwrote his plans to change the world.

It is important to remember that elsewhere Iltis did make specific claims in genetics and racial science that directly challenged work associated with the *völkisch* (nationalist and racist) right. He sought an humane science of race, and would later insist in his *Urania* book on 'Popular Racial Science' that '[b]lood unites – blood does not separate the races'. He discovered 'the

tendency within German science', present also in Braun's article, 'uncritically and enthusiastically to accept any hypothesis that seems suited to accentuate the differences between the races and to deepen it into a matter of blood'. But there were relatively few issues on which the battle lines were so clearly drawn. More typically, Iltis and Braun agreed that Carl Mez had done an impressive and largely valid piece of work; both presented criticism of some details as appropriate. This chunk of 'bourgeois science' had passed through the socialist sieve. Indeed, many of *Urania's* articles on natural science were much less overtly political than Iltis' – a few authors even wrote for both magazines. In these cases *Urania* relied more heavily on the frame to distinguish itself from *Kosmos*, using a carefully placed Engels quote here, or a telling juxtaposition there. The difference was in the deployment, in the context of a whole issue and within individual articles. And this, as we shall see more explicitly in the next section, could add up to very different messages, to asking readers to take very different action. That, as much as specific positions on controversial topics, was the nature of what, in an appropriate metaphor, a reviewer of Iltis' book welcomed as a "cross" between science and socialism', a product of the 'intensive breeding of the human intellect'.⁴⁷

SCIENCE, CLASS STRUGGLE AND LIFESTYLE REFORM

Urania's redefinition of the popular-science magazine did not end here. It also introduced social science and a regular supplement, *Social Hiking*, in which readers were shown how to do Marxist sociology. But there was still more. For when *Urania* authors wrote of having the courage to draw conclusions from science, they meant to change their readers' most intimate lives. As Otto Jenssen, a lecturer at Tinz socialist college, wrote under the heading 'Lifestyle Reform and Class Struggle':

We know today through natural science, especially through biology and medicine, an endless amount about processes in the human body and their meaning for the mental health of the person. The difficult task of lifestyle reform is, however, to apply this knowledge in the practical life of the individual, to proceed from science to technology.⁴⁸

The various initiatives for vegetarianism, 'natural healing', naturism and the like that came to prominence around the turn of the century were associated with a variety of often individualist politics or even the *völkisch* right. They also tended to have difficult relations with official science and medicine. *Urania*, by contrast, sought to promote rigorously scientific and specifically socialist forms of these activities.

The magazine's second supplement, *The Body*, dealt with healthy living and physical training, welding various countercultural practices popular

among the *Naturfreunde* and in the more narrowly focused socialist cultural organizations into a scientifically grounded lifestyle suitable for forming 'free people'. Readers were not just to be freed from superstition: class-conscious proletarians were also to be sexually liberated and control their reproduction; to reject alcohol, dress in reform clothes and live in rooms uncluttered by kitsch; and to have the tanned, healthy bodies of the nudist gymnast. True socialists could not continue to behave like petit-bourgeois individualists, they had to become disciplined and responsible fighters, living healthy lives in solidarity with their fellow proletarians. But it would be one-sided to interpret *Urania* simply as a forum in which social reformers and dissident physicians inculcated workers with notions of socialist 'duty'. *The Body* was about building the public 'body culture' of the future, in which socialist professionals joined with those they considered, and who considered themselves, the most advanced fraction of the proletariat in rejecting not just the degenerate bourgeoisie, but also those fellow workers reckoned to be shiftless or hide-bound. This elitist vanguardism, and even going hiking, could be rewarded with ridicule from the large majority of less 'enlightened' comrades. A *Naturfreund* reported that when he first 'came to work in shorts and heavy hobnailed boots', he had been 'teased and tormented . . . with personal remarks filled with crude, biting mockery'.⁴⁹

The activity in *Urania's* programme that was most derided by non-participants in the party and the unions was naturism. Theodor Hartwig, a grammar-school teacher and chairman of the Proletarian Freethinkers' International, explained why *Freikörperkultur*, literally 'free body culture' and including physical exercise, was part and parcel of the magazine's scientific *Weltanschauung*:

The upright body is the vessel of an upright mind, taut muscles the symbol of unshakeable conviction. If the workers' sport associations have prepared the way, the proletarian freethinkers have an easy task, directing the will to repression into healthy paths, clearing out unhealthy habits and sweeping the debris of past centuries from the worker's mind.⁵⁰

But why did the sport have to train *naked* bodies? Nudity was not, after all, a monopoly of groups on the left. Though it was difficult to reconcile naked bodies with the respectability the fascists sought to preserve, and the right persecuted the supposedly immoral naturists in the last years of the Republic, once in power the Nazis celebrated naked Greek sculptures as the essence of Aryan beauty. Adolf Koch and Hermann Schmidt, the ideologists of socialist naturism – and most Weimar naturists were on the left – presented *Urania's* readers with a different ideal. Whilst the bourgeois was well-fed, had plenty of light and air, and used sport for mere relaxation, your average proletarian was, they argued, a walking-wounded survivor of the

class war. Only *naked* physical training could compensate for the poverty and darkness of proletarian living conditions and the one-sided exertion of labour. In their legitimatory zeal, the socialist ‘sun worshippers’ not only appealed to health and self-confidence, but also insisted that only rigorous exposure to light and air could steel proletarian bodies for the struggle ahead.⁵¹

Urania’s Social Hiking section was the major forum for those *Naturfreunde* who opposed right-wing promotion – including within their own organization – of hiking as romantically getting ‘back to nature’, and sought instead to unite their various activities around a new, partisan version of their basic practice. Readers were, quite traditionally, encouraged to go beyond admiring the beauty of nature to understanding it in scientific terms. But so that hiking, rather than distracting from the class struggle, would allow *Naturfreunde* to fight it with ‘new physical powers and sharpened mental weapons’,⁵² ‘social ramblers’ were also taught to view the world they encountered with ‘sociologically trained eyes’.⁵³

How was this sensibility to be cultivated? As usual, different *Urania* authors tackled the problem in different ways. Werner Inter reckoned it was simply a matter of ‘letting what is seen pass through the filter of one’s *Weltanschauung*’, so: ‘eyes open, mind in motion, and polish up [*klären*] your Marxist filter’. This would lead to a strengthening of class consciousness. Anna Siemsen, on the other hand, used gentle sarcasm to encourage a new kind of proletarian travel writing. She accurately predicted that bourgeois travel guides would become important documents for future historians.

When e.g. Baedeker advises as little luggage as possible for journeys on foot and adds: ‘When staying in larger inns formal dress is indispensable’, this one sentence shows the world for which he is writing more completely than the longest philosophical reflection. Back to nature, hiking and living out of a rucksack, simplicity and sport, but please, always with formal dress, correctness and luxury in reserve. You’re allowed to appear simple, primitive, even rough, but we have to know that you’re only doing it as a game, on a whim, but not because you have no money.

Baedeker contained everything that was of interest to the bourgeois world once it had put its business aside, but nothing about the working class, the labour movement or the economies of the different places. Her readers should leave Baedeker to the bourgeois, but could they not make their own guide books,

which contain what interests us, which give the travelling proletarian his trade union houses and hostels, . . . which tell him of the development of a landscape and of a town, of its work in society and its struggles, of its culture and history, as we see them, and as they matter to us?

These might become 'just as perfect a document of the developing culture of the working class as Baedeker has become for the bourgeoisie'.⁵⁴

One such document is Siegfried Ziegler's article on 'The Double Face of the Thuringian Forest', which aimed 'to win the "green heart of Germany" for the proletariat'. One face gazed with dreamy eyes from beautiful hills, taking deep breaths of the pine air and offering sport of all kinds, society and company of every degree. The other looked from low hovels with pale, hollow cheeks and stared from ragged children's clothes at 100 horse-power cars throwing up the dust. Now, these were less two faces than two ways of seeing, for the Forest was the same whether visited by a proletarian looking for work or a 'well situated' visitor there for a *Kur* (health cure).—Ziegler used photographs to show his readers how to draw these contrasts, how, that is, to campaign for the labour movement in a region that was a frequent goal for *Naturfreunde*, but notorious for its poverty and the difficulty of organizing its desperately exploited homeworkers (Fig. 6). He also practised what he preached. When he took a group of twelve-year-old boys to camp on the coast, they got to feel the 'vulgar arrogance' of the *Kur* visitors and their affected children, who called them 'gypsies', but made friends with their class comrades, the local fishermen who took them sailing.⁵⁵

'Social rambles' often visited other workers at work; this, *Urania* argued, would broaden their horizons of solidarity. The magazine organized the world of work in an evolutionary relation to the modern, rationalized factories in which laboured its ideal readers. Most of the articles described those at the margins of industrial society, especially the homeworkers of the Thuringian Forest (access was easy and they lived in great walking country). *Urania* featured charcoal burning, pen-knife manufacture, lace making and drawing the scales of thermometers. Alfred Forbrig, a functionary in the Jena-based Thuringian *Naturfreunde*, illustrated his article on the glass industry in the villages of the Thuringian Forest with his own photos. Often organized on a family basis and paid on a piece-rate, these workers were presented as the last representatives of an earlier stage of industrial evolution. But Forbrig had a more personal relationship to homework than he cared to express in a 'scientific' magazine: he was writing not just about what was soon to be the evolutionary past of humanity, but of an earlier stage in his own life that he was glad to have left behind. He had himself begun sewing collars at the age of six, so he was speaking from experience when he urged the homeworkers to recognize that they could make a future for themselves only by joining the labour movement (Fig. 7).⁵⁶

What, then, of the modern factory, which represented the present pinnacle of progress? Just as the science that could not flourish in bourgeois society should not be rejected wholesale, so capitalist machinery must not be destroyed, but the economic limits to progress overcome. In a scary metaphor *Urania* decried 'technology with a capitalist muzzle'.⁵⁷



Fig. 6. The Double Face of the Thuringian Forest. Left. 'A 73-Year-Old Wood Collector from Wahlwinkel'. 'This is how a proletarian sees the Thuringian Forest. For him [*sic*] the forest means poor ground. The high mountains make harder the work that brings in only a meagre wage.' Right. 'View of the Inselberg from the Car'. 'This is how a well-off *Kur* visitor sees the Thuringian Forest'. From Ziegler, 'Doppelgesicht', p. 311, by permission of Ullrich Keller.

Though some authors were sensitive to the alienation of work in Taylorized factories, *Urania's* evolutionary framework naturalized capitalist rationalization as a necessary precondition for takeover by socialist planners. Perhaps more importantly, *Urania* actually had relatively little to say about its readers' working lives, concentrating instead on how to use their newly-won leisure. These, at least, were aspects of the magazine's programme with which the scientific managers at firms like Zeiss could hardly disagree.

URANIA, KOSMOS AND THE NATURFREUNDE

Urania was part of what the political right and the churches sloganized in the final years of the Republic as 'cultural Bolshevism'. The evangelical church in Thuringia certainly kept an eye on the magazine, but its mode of distribution makes it unlikely that it circulated much outside the socialist and anti-clerical milieu.⁵⁸ *Urania* took out advertisements in the magazines of the labour and freethinking movements. It was 'the daily mental bread', 'the organ from our own camp that communicates [knowledge of nature and society] in easily understandable form'.⁵⁹ But it was in the reviews these magazines carried that *Urania* publications were most consistently presented to readers – and that the company's fight to take sides on science was most publicly assessed. I want now to explore the final stage in the production of *Urania* and *Kosmos*, by focusing on the *Naturfreunde*, their core joint constituency, and asking what they made of the two magazines.



Fig. 7. Top. 'In areas that are industrially still little developed, child and youth homeworkers must manufacture toys, instead of playing themselves.' Bottom. 'Meanwhile the proletarian youth organizations as part of the organized masses have paved the way to the future through the free youth to liberation itself.' From *Urania* 6:1, 1929, p. 23, by permission of Ullrich Keller.

Urania's partisanship drew a veiled response from *Kosmos*. The older magazine continued to have a total circulation over 100 000 between 1922 and 1933,⁶⁰ but it felt threatened enough to emphasize in its first two editorials after the founding of its socialist competitor – as it had not in those just before – that it had always rejected the mixing of science with religion or politics, that it did not want ‘to preempt the truly free person, but provide him with various and reliable documents from all areas of knowledge, from which each could form his own judgement’.⁶¹ For *Kosmos*, science was a realm apart from politics, so its articles could be used by people of different persuasions in forming their judgements and arriving at a world view.

Before *Urania* appeared on the scene, there was widespread satisfaction with *Kosmos*. *Der Naturfreund*, the international journal of the organization, gushed when *Kosmos* was twenty, ‘We cannot help but be overcome with joy when thinking over in the mind the enormous work of enlightenment that this magazine has accomplished.’⁶² Schaxel was up against this when he thundered that it was ‘the task, indeed the absolute duty of every proletarian, everywhere in his ranks to replace the relevant bourgeois-capitalist literature with his *Urania!*’⁶³ And *Urania* did establish itself quickly, as *Der Naturfreund* conceded: ‘Even the envious must admit that [*Urania*] has, in the face of various difficulties, achieved marvellous things.’ It was developing increasingly into ‘the natural gospel of working people’. Nevertheless, the politically middle-of-the-road *Der Naturfreund* still recommended *Kosmos* because, ‘You continually have to be amazed by this splendid magazine.’⁶⁴ Some of the regional magazines of the *Naturfreunde* did advertise only *Urania* in their columns, but most had room for *Kosmos* too. Tellingly, the Jena-based Thuringian *Naturfreunde*, one of the most left-wing districts, promoted *Kosmos* along with *Urania*, albeit with less zeal; both magazines could eventually be ordered through the district.⁶⁵ One of the reasons for *Kosmos's* continued popularity among the *Naturfreunde* was probably simply that it contained a much higher proportion of articles on natural science – the main interest of this group of readers – than its competitor. To assess attitudes to the two magazines, however, we need to look more carefully at what readers could do with them.

Herbert Richter, who reviewed for *Der Wanderer*, the magazine of the *Naturfreunde* in Saxony, wrote an unusually informative set of commentaries. He cautiously and then enthusiastically sought to lead the Saxon hikers and climbers to the new magazine. Taking his cue from Max Hodann's article in the previous month's *Urania*, Richter slammed *Kosmos* in November 1926 for not concluding that the ill health described in its number on the Reich Health Week should be laid at the door of capitalism:

That is the disastrous thing about even the most well-meaning bourgeois enterprise, that even there, where they notice contradictions in our ‘culture’, they do not dare, cannot dare, to denounce them.

In December he repeated this sentence, and went on,

Then I was aiming at *Kosmos*. If I now introduce a discussion of *Urania* with this repetition, I may do this because Ernst Mühlbach in his *Urania*-book 'Luck and Tragedy of Inheritance' [*Glück und Tragik der Vererbung*] has again acquainted me with some cases of such half-measures of bourgeois scientists, and because – and this is the main thing – even in this book, which he calls an ABC of genetics, he does more than establishing and describing. Even his introduction . . . shows his sharp opposition to bourgeois learning.

When *Kosmos* celebrated its twenty-fifth anniversary, Richter again invited readers of his column, 'Books for Us', to lament the shortcomings of the bourgeois publication:

What the reader will miss is treatment of contemporary history and sociology. Where in an article sociological trains of thought are present, readers from our circle are recommended a certain care. Or do you all agree with the following statements: '. . . and since the machine daily takes more of the burden of heavy work from our shoulders . . . human beings are more and more relieved of drudgery.' 'Holidays, once the privilege of rulers, became the right of all.' 'And today the machine-driver, Virginia in the corner of his mouth, oversees the movement of the pistons of the iron Cyclops that do his work.' 'Comrades at the machine! I'd be immensely happy if it were already like that. I still hear, however, about the fight for holidays, but nothing about Virginia-smoking machine-drivers. – In spite of all that, I stand by what I said at the start: *Kosmos* is, precisely because it devotes itself mainly to the natural sciences, indispensable for the *Naturfreund*.⁶⁶

Richter praised *Urania's* politics, approved of social hiking and naturism, and particularly commended the way that he reckoned *Urania* was following a plan. And yet, though he recognized the 'bourgeois-capitalist' bias in *Kosmos*, and appreciated *Urania's* writing on natural science, this committed functionary continued to put *Kosmos* before his readers.

Was Richter telling them that they had to take sides on social questions, but not on nature, that he saw little difference between 'bourgeois' and 'socialist' as far as natural science was concerned? No. But whereas he treated 'bourgeois' social analysis as tainted at source, he showed his readers how they could make use of even *Kosmos's* natural science. Take R. H. Francé's *Kosmos* book-supplement 'Harmony in Nature', in which, from moonlit contemplation of the perfect proportions of the Sphinx, he

developed the insight that ‘the world is a system in balance’. When the book came out, the traditional *Der Naturfreund* recommended it, because,

He who respects the unalterable laws of life to which we are subjected, he will discover this harmony everywhere in life, he will come to terms with the fact that sorrow must exist, because it is the cause of happiness, he will be pleased that age-old truth can be proven with modern evidence.

Hardly likely to send its readers to the barricades. But those *Naturfreunde* in Saxony who read Richter’s review in their own magazine could take home precisely this message:

Translated into our view of the economy and the world it means that socialism is the necessary compensation for the destruction of the harmonious edifice of the body of humanity by capitalism, it means a natural scientific confirmation of the theses on the development of economic life set down in Marx’s Communist Manifesto.⁶⁷

Needless to say, Francé had mentioned neither socialism nor Marx: subversive readings of ‘bourgeois science’ were not confined to the editorial councils of *Urania*. *Kosmos*’ mask of neutrality was readily seen through, but there was something in its claim that readers could use what it sold them for their own purposes. In spite of Schaxel’s insistence that ‘special functionaries’ were indispensable, those who got their views into print were generally confident that they could use science for their own purposes in spite of its ‘bourgeois’ origin. Readers were pleased to avail themselves of the help of ‘experienced personnel’, but were not dependent on them.

The issue between *Kosmos* and *Urania* was generally discussed in terms of *Urania*’s socialism or weaning workers off ‘bourgeois science’, but even for left-wing *Naturfreunde* what *Urania* shared with *Kosmos* may have mattered more than what divided them. It may be that *Urania* with its socialist gloss acted as a more effective medium for the transmission of science to committed socialists than the obviously bourgeois *Kosmos*. Both, though, were praised as accessible but high-quality publications; both were largely written by a different set of authors and in a quite different way from the numerous articles on science in the magazines of the *Naturfreunde* themselves; and both offered resources that could be used to prepare and discuss lectures, to put on exhibitions or when out walking.

We have seen in comparing *Urania* and *Kosmos* something of the strategies that presses and authors used to guide their readers to particular conclusions. But evidence such as the reviews of ‘Harmony in Nature’ might suggest that readers could make just what they wanted of *Kosmos*, and use the resources that *Urania* offered them as they liked. They could not. Recall Fritz Barth, whom we last met discussing *Urania* in the youth hostel so that

he could make contributions after lectures. He used and valued the magazine, but just how useful could *Urania* be to him? He recalled,

And so it . . . seemed to us that we could now join in ourselves in the realm of knowledge. Friends built up greater hopes, who now saw the way smoothed to science. Illusions like that were out of the question when we were invited to an evening discussion in the homes of the comrade scientists (*Wissenschaftlern*). The hosts seemed to me to attach more importance to what was going on in the heads of the workers' youth, what relations were like in the factories, . . . which they surely used for their work. At these meetings there was also something to eat or drink, but no alcohol. They were mostly teetotal. We were very proud that we had an invitation. Such as to Prof. Julius Schaxel, Prof. Anna Siemsen. . . . Now to our illusions again. Because we were now starting to do politics scientifically too, we thought the way clear for us to become scientists, even professors. But that was too much, a big illusion. We had to grasp that in the previous decades science had opened up many new areas and that it was completely unthinkable that *Urania* would have been in a position to deal with the new and growing tasks of science.⁶⁸

Barth came to see that a magazine like *Urania* could not have provided what was needed to become a scientist; it never claimed it would. But more damningly, this leading functionary who could hold his own in discussions in the labour club found as he struggled with knife and fork during an interminable meal⁶⁹ that at the professor's dinner table he was not granted a say in the realm of knowledge. Instead, confounded by academic authority, he was mined for information on working-class life.

Further questions are now clear. What place did natural knowledge really occupy – and what knowledge occupied this place – in the lives of the *Naturfreunde*, their families and colleagues? To answer we shall need to reconstruct their lives, rather than just their place in *Urania's* short life, but two points can be made already. First, many of the resources available to *Naturfreunde* came via *Kosmos* and *Urania*, so the processes of communication that I have been analysing here helped to produce their knowledge of nature. This did not exist in some separate 'popular' realm, but was constituted in part through contacts with academic purveyors of popularized knowledge. Second, we should expect to find conflicting stances, especially between those *Naturfreunde* who distinguished themselves by hard-won knowledge of the natural world, and those outside – and even within – their ranks whose lack of interest in natural science they bemoaned. A world of distinction and disdain produced such laments as, "What good is your science to us!" How often have we had to hear this, how often have we been described as odd-balls, as useless fighters'.⁷⁰

A second major question concerns participation. We have seen that *Naturfreunde* interpreted what they read and used it for their own purposes.

But to what extent did they consider themselves to be participating, or aspire to take part, in science? Barth's disappointment is an index of the barriers that *Urania* pointed out existed under capitalism to the dream of rising like Michael Faraday from humble origins to become a renowned scientist – barriers that *Urania* authors worked to remove. There may, though, very well have been laboratory technicians among *Urania*'s readers. But the publications of the *Naturfreunde* hint that some considered themselves to be participating in science in quite a different – and much more challenging – sense. What did they mean when they wrote of 'our work for science', or asked, 'why do we pursue natural science?'⁷¹

EPILOGUE

Urania's political struggle over science came to an abrupt end with its March 1933 issue, which commemorated the fiftieth anniversary of Marx's death. Though three more issues appeared before the company was liquidated, they were forced not to offend. Those who produced *Urania* now began to suffer and make for themselves various fates in the situation they had worked to prevent. Kurt Jahn, who had taken over from Pfeuffer as manager of the TVD, committed suicide; Julius Schaxel went via Switzerland to exile in the Soviet Union. He wrote from Geneva to Walter Federbusch, manager of the *Urania* Press and now of the TVD, about how the magazine might take leave of its readers in its last, June 1933 issue.

I have tried to write down a few words of farewell, but precisely because of my relatively detached position from the situation there can't compose anything right. Just nothing sentimental or explanations that only hide the true reason! Perhaps the best thing would be quite short, like this:

With this issue *Urania* says farewell to the thousands of friends, who have remained faithful to the end. We will return!

And we will return whatever happens, of course differently from how the opportunists, laden with historic guilt, are still hoping today.⁷²

The 'opportunists' were those on the right of the SPD whom Schaxel, increasingly close to the communists, obviously blamed for diluting the socialist message. Federbusch was not, of course, able to print the defiant 'We will return', but only the more final, 'Always remember our educational work'.⁷³ Most of the staff were laid off, but until he was drafted Max Kessler continued to work for newspapers under the new regime; Hugo Iltis emigrated to America; Heinrich Schmidt launched *Natur und Geist* ('Nature and Spirit'), a journal that served a rather different politics from *Urania*; and Federbusch spent three weeks in a concentration camp, but eventually got a job as a book-keeper until he too was called up.

Urania continued, however, to be read. According to historian of

biology Konrad Senglaub, unlike more 'political' literature of the left, volumes did not become so dangerous that they had to be thoroughly hidden during the Nazi period. Then a schoolboy (at an *Oberrealschule*), he read his father's copies, which stood in the bookcase, 'not in the front row, but still always available'. His father, who had been a bookseller, member of the Monist League, social democrat, and from 1931 a member of the KPD, did, however, lose the second volume when an official confiscated it during a house search and he chose not to take up the offer of appearing at police headquarters to reclaim it.⁷⁴

As Schaxel had predicted, *Urania* did return, but not until 1947, four years after his death, and then perhaps in a form that fourteen years earlier would have surprised not only the 'opportunists'. It became a mass-circulation popular-science magazine in the German Democratic Republic, and the Urania Press a major East German publisher.⁷⁵ That *Urania* has now also ceased to appear, but it points to the place of the Weimar project in a longer history of 'socialist' or 'proletarian' science. The first Jena *Urania* sought to reinvigorate the natural science that informed the Marxism of the Second International in the very changed circumstances of the 1920s; by the time the second appeared Stalinist orthodoxy faced 'bourgeois science' across the Cold War divide.

Here, though, I have analysed *Urania* as a distinctive cultural product of the left of the Weimar SPD. Certainly, it failed to stem the rise of Nazism, and probably contributed to a dangerous increase in the power of scientific, technical and medical experts. The magazine is also no exception to Roger Cooter and Stephen Pumfrey's recent reminder that, 'though many people have been revolted by science', there has 'never been a successful scientific revolution', in the sense of a fundamental transformation in the relations of scientific production.⁷⁶ I have tried, though, to show that if we do not let these valid generalizations block further inquiry, we can begin to tell a history that comes closer to the lives and labour of the socialists who struggled over science in the Weimar Republic. *Urania's* rich and sometimes exotic scientific culture was built in a milieu in which scientific authority could not be taken for granted, but had to be achieved and was challenged. If *Urania's* readers had faith in science, and many did, this was no taken-for-granted assumption. It was the contested product of hard work in the heat of political struggle and in everyday life.

ACKNOWLEDGEMENTS

I gratefully acknowledge the work of the late Helmut Vetter, and thank Ullrich Keller for loan of *Urania*, Erika Krauß, Rüdiger Stutz, Jürgen John, Kurt Meinel and Jörg Valtin (all in Jena), Klaus-Peter Lorenz (AROEK, Baunatal), Heinrich Eppe (Archiv d. Arbeiterjugendbewegung), Horst-Peter Schulz (Friedrich-Ebert-Stiftung), Rainer Noltenius (Fritz-Hüser-Institut), Paul Weindling, Dick Geary, Chris Szejmann and the staffs of SAPMO and the Thüringisches Hauptstaatsarchiv Weimar for advice and help; Lutz Heydick and his colleagues

at *Urania* in Leipzig, and Günter Hörnig (Jena) for making documents available; and, for letting me interview them, Max Kessler, Karl Brundig and Gerda Groll, who also discovered important documents. Preparation of the paper was spurred by useful criticism from the History of Biomedicine Reading Group in Cambridge and audiences at the Centre for the History of Science, Technology and Medicine in Manchester and the Warwick Workshop for Interdisciplinary German Studies' conference on 'Culture and Politics in Weimar Germany'; the manuscript was further transformed by the insightful comments of Anne Secord, Jim Secord, Roger Cooter, Juanita Roche, Richard Ashcroft, Simon Schaffer, Klaus-Peter Lorenz, Stefan Berger, Jon Topham and Paul Weindling. Special thanks to Jim Secord for his encouragement of this work, which was generously supported by the Wellcome Trust.

GUIDE TO REFERENCES AND ABBREVIATIONS

Where in citations of *Urania* no article is mentioned, reference is to the regular section 'An die Freunde und Leser der "Urania"!' ('To the Friends and Readers of *Urania*') in the end-matter of the magazine.

TVD: Archive of the successor printers to the Thüringer Verlagsanstalt und Druckerei, currently the Druck- und Verlagshaus Jena G.m.b.H.

UV: *Urania* Verlagsarchiv, Leipzig. This is not the original company archive, which was destroyed in 1933, but a collection made in the 1980s by Helmut Vetter, a former sales manager of the successor company.

NOTES

1 From the vast literature, see the stimulating survey, Detlev J. K. Peukert, *The Weimar Republic: the Crisis of Classical Modernity*, transl. Richard Deveson, London, 1991; and also his 'The Genesis of the "Final Solution" from the Spirit of Science', in David F. Crew (ed.), *Nazism and German Society 1933–1945*, London, 1994, pp. 274–299; most recently on rationalization, see Mary Nolan, *Visions of Modernity: American Business and the Modernization of Germany*, New York and Oxford, 1994; and on eugenics, see especially Peter Weingart, Jürgen Kroll and Kurt Bayertz, *Rasse, Blut und Gene: Geschichte der Eugenik und Rassenhygiene in Deutschland*, Frankfurt/Main, 1992 [1988]; Paul Weindling, *Health, Race and German Politics between National Unification and Nazism 1870–1945*, Cambridge, 1989.

2 On labour-movement culture in the Weimar Republic, see Hartmann Wunderer, *Arbeitervereine und Arbeiterparteien: Kultur- und Massenorganisationen in der Arbeiterbewegung (1890–1933)*, Frankfurt/Main and New York, 1980; Dieter Langewiesche, 'Politik – Gesellschaft – Kultur: zur Problematik von Arbeiterkultur und kulturellen Arbeiterorganisationen in Deutschland nach dem 1. Weltkrieg', *Archiv für Sozialgeschichte* 22, 1982, pp. 359–402; Wilfried van der Will and Rob Burns, *Arbeiterkulturbewegung in der Weimarer Republik: eine historisch-theoretische Analyse der kulturellen Bestrebungen der sozialdemokratisch organisierten Arbeiterschaft*, Frankfurt/Main, 1982; W. L. Guttsman, *Workers' Culture in Weimar Germany: between Tradition and Commitment*, New York, 1990; articles in *Mitteilungen aus der kulturwissenschaftlichen Forschung* 15, 1992, H. 30, 'Arbeiter und Massenkultur'.

3 Hans-Josef Steinberg, *Sozialismus und deutsche Sozialdemokratie: zur Ideologie der Partei vor dem 1. Weltkrieg*, 4th edn, Berlin and Bonn – Bad Godesberg, 1976; Alfred Kelly, *The Descent of Darwin: the Popularization of Darwinism in Germany 1860–1914*, Chapel Hill, 1981, pp. 123–141; Richard J. Evans (ed.), *Kneipengespräche im Kaiserreich: die Stimmungsberichte der Hamburger Politischen Polizei 1892–1914*, Reinbek bei Hamburg, 1989, pp. 167–181. For useful works on science and British socialism, see Roger Cooter, *The Cultural Meaning of Popular Science: Phrenology and the Organization of Consent in Nineteenth-Century Britain*, Cambridge, 1984, pp. 201–255; Adrian Desmond, 'Artisan Resistance and Evolution in Britain, 1819–1848', *Osiris* 2nd series 3, 1987, pp. 77–110; Logie Barrow, 'Determinism and Environmentalism in Socialist Thought', in Raphael Samuel and Gareth Stedman Jones (eds),

Culture, Ideology and Politics: Essays for Eric Hobsbawm, London, 1982, pp. 194–214; Gary Werskey, *The Visible College: a Collective Biography of British Scientists and Socialists of the 1930s*, London, 1988 [1978]; Stuart Macintyre, *A Proletarian Science: Marxism in Britain 1917–1933*, Cambridge, 1980; Jonathan Rée, *Proletarian Philosophers: Problems in Socialist Culture in Britain, 1900–1940*, Oxford, 1984.

4 Kurt Bayertz, 'Naturwissenschaft und Sozialismus: Tendenzen der Naturwissenschafts-Rezeption in der deutschen Arbeiterbewegung des 19. Jahrhunderts', *Social Studies of Science* 13, 1983, pp. 355–394.

5 Rée, *Philosophers*, p. 9.

6 Kelly, *Descent*, p. 145. Changes in borrowing from libraries were not actually that sudden, but socialist education definitely had a different emphasis after 1918; see Hans-Josef Steinberg, 'Workers' Libraries in Germany before 1914', *History Workshop* 1, 1976, pp. 166–180; Dieter Langewiesche and Klaus Schönhoven, 'Arbeiterbibliotheken und Arbeiterlektüre im Wilhelminischen Deutschland', *Archiv für Sozialgeschichte* 16, 1976, pp. 135–204; Dieter Langewiesche, *Zur Freizeit des Arbeiters: Bildungsbestrebungen und Freizeitgestaltung österreichischer Arbeiter im Kaiserreich und in der Ersten Republik*, Stuttgart, 1980.

7 See Loren R. Graham, 'Eugenics: Weimar Germany and Soviet Russia', in his *Between Science and Values*, New York, 1981, pp. 217–256 and 403–408; Atina Grossmann, 'The New Woman, the New Family and the Rationalization of Sexuality: the Sex Reform Movement in Germany 1928 to 1933', PhD thesis, Rutgers University, 1984; Paul J. Weindling, 'Die Verbreitung rassenhygienischen/eugenischen Gedankengutes in bürgerlichen und sozialistischen Kreisen in der Weimarer Republik', *Medizinhistorisches Journal* 22, 1987, pp. 352–368; Kristine von Soden, *Die Sexualberatungsstellen der Weimarer Republik 1919–1933*, Berlin [W], 1988; Cornelia Osborne, *The Politics of the Body in Weimar Germany: Women's Reproductive Rights and Duties*, Basingstoke and London, 1992; and especially the important review, Michael Schwartz, 'Sozialismus und Eugenik: zur fälligen Revision eines Geschichtsbildes', *IWK* 25, 1989, pp. 465–489.

8 See Dick Geary, 'Employers, Workers, and the Collapse of the Weimar Republic', in Ian Kershaw (ed.), *Weimar: Why Did German Democracy Fail?*, London, 1990, pp. 92–119.

9 The classic text is Max Horkheimer and Theodor W. Adorno, *Dialectic of Enlightenment*, transl. by John Cumming, New York, 1972 (first published in German, 1947).

10 Roger Cooter and Stephen Pumfrey, 'Separate Spheres and Public Places: Reflections on the History of Science Popularization and Science in Popular Culture', *History of Science* 32, 1994, pp. 237–267; this issue of *History of Science* was reviewed by Felix Driver in *History Workshop Journal* 39, Spring 1995, pp. 212–214.

11 *50 Jahre Urania-Verlag 1924–1974*, Leipzig, 1974; Helmut Vetter, 'Geistige Erweckung des Proletariats: die Jenaer Urania 1924 bis 1933: Zeitschrift, Verlagstätigkeit, Freies Bildungsinstitut', *Börsenblatt für den deutschen Buchhandel* (Leipzig) 153, 1986, pp. 777–780; *idem*, 'Bildungsarbeit für die geistige Erweckung des Proletariats: Lebensweg des Mitbegründers des Urania-Verlags, Prof. Dr. Julius Schaxel: Teil 1', *Börsenblatt* 154, 1987, pp. 160–164; *idem*, 'Wissenschaftler und populärer Publizist: Lebensweg des Mitbegründers des Urania-Verlags, Prof. Dr. Julius Schaxel: Schluß', *Börsenblatt* 154, 1987, pp. 197–200; UV: *idem*, 'Zur Geschichte des Urania-Verlages, Leipzig Jena Berlin: Teil I. Die Jenaer Periode 1924–1933', unpublished ms., n.d.; Heinrich Eppe and Helmut Vetter, *Artikelbibliographie der Zeitschrift URANIA*, Oer-Erkenschwick, 1992.

12 Robert Darnton, 'What is the History of Books?', *Daedalus* 111: 3, 1982, pp. 65–83.

13 On Jena, see Herbert Koch, *Geschichte der Stadt Jena*, Stuttgart, 1966; Jürgen John (ed.), *Jenaer stadthistorische Beiträge*, Jena, 1993; Siegfried Schmidt (ed.), *Alma Mater Jenensis: Geschichte der Universität Jena*, Weimar, 1983, pp. 249–297; on Haeckel, see Paul Weindling, 'Ernst Haeckel and the Secularization of Nature', in James R. Moore (ed.), *History, Humanity and Evolution: Essays for John C. Greene*, Cambridge, 1989, pp. 311–327; and most recently on Zeiss, see Rüdiger Stolz and Joachim Wittig (eds), *Carl Zeiss und Ernst Abbe: Leben, Wirken und Bedeutung*, Jena, 1993.

14 On the SPD in these states, see Dietmar Klenke, *Die SPD-Linke in der Weimarer Republik: eine Untersuchung zu den regionalen organisatorischen Grundlagen und zur politischen Praxis und Theoriebildung des linken Flügels der SPD in den Jahren 1922–1932*, 2 vols, Münster, 1983; Franz Walter, Tobias Dürr and Klaus Schmidtke, *Die SPD in Sachsen und Thüringen zwischen Hochburg und Diaspora: Untersuchungen auf lokaler Ebene vom Kaiserreich zur Gegenwart*, Bonn, 1993; and on Thuringian educational reform, see Paul Mitzenheim, *Die Greilsche Schulreform in Thüringen: die Aktionseinheit der Arbeiterparteien*

im Kampf um eine demokratische Einheitsschule in den Jahren der revolutionären Nachkriegskrise 1921–1923, Jena, 1965.

15 Frank Heidenreich, *Arbeiterbildung und Kulturpolitik: Kontroversen in der sozialdemokratischen Zeitschrift "Kulturwille" 1924–1933*, Berlin [W], 1983; Herwig Decker, 'Kosmos (1904–1933): die Anfangsjahre einer populärwissenschaftlichen Zeitschrift', Diplomarbeit, University of Munich, 1990.

16 'An unsere Mitglieder!', *Kosmos* 20, 1924, p. 1. Throughout, translations are mine, and emphasis, unless otherwise stated, is in the originals. I have rendered *Wissenschaft* as 'science' or, in accordance with its broader meaning, as 'learning'. In most cases the word is being used generally, but with special reference to the natural sciences.

17 'An unsere Mitglieder!', *Kosmos* 24, 1927, p. 1.

18 'Proletarian' and 'bourgeois' were the left's terms for labour-movement and non-labour-movement institutions; they do not refer strictly to class composition. I discuss the politics of their meaning below.

19 On Mühlbach, see *Handbuch d. Vereins Arbeiterpresse*, 4. Folge, Berlin, 1927, p. 404; on the bourgeois Urania movement, see Harro Hess, 'Die Geschichte der Gesellschaft Urania zu Berlin und die Widerspiegelung der wissenschaftlich-technischen Entwicklung: ein Beitrag zur Wissenschaftsgeschichte und zur Organisation der Popularisierung wissenschaftlich-technischer Erkenntnisse', PhD, University of Greifswald, 1969; G. Ebel and Otto Lührs, 'Urania: eine Idee, eine Bewegung, eine Institution wird 100 Jahre alt!', in Urania Berlin e.V. (ed.), *100 Jahre Urania Berlin: Festschrift: Wissenschaft heute für morgen*, Berlin [W], 1988; Klaus-Harro Tiemann, 'Institutionen und Medien zur Popularisierung wissenschaftlicher Kenntnisse in Deutschland zwischen 1800 und 1933 (ein skizzenhafter Überblick)' in *Probleme der Kommunikation in den Wissenschaften*, Institut für Theorie, Geschichte und Organisation der Wissenschaft, Kolloquien Heft 75, Berlin, 1991.

20 *Urania* 1:5, 1925, I; for cooperation between Austrian social democrats and the Vienna Urania, see Langewiesche, *Freizeit*, pp. 269–270.

21 (Julius Schaxel), 'Was will die "Urania"?', *Urania* 2:1, 1925, p. 1.

22 Nick Hopwood, 'Biology between University and Proletariat: The Making of a Red Professor', submitted for publication; Dieter Fricke, *Julius Schaxel 1887–1943: Leben und Kampf eines marxistischen deutschen Naturwissenschaftlers und Hochschullehrers*, Jena, 1964; Erika Krauß (ed.), *Julius Schaxel an Ernst Haeckel, 1906–1917*, Jena, 1987.

23 Jochen Zimmer, 'Mit uns zieht die neue Zeit', in *idem* (ed.), *Mit uns zieht die neue Zeit: die Naturfreunde: zur Geschichte eines alternativen Verbandes in der Arbeiterkulturbewegung*, Cologne, 1984, pp. 12–30, p. 16. On the *Naturfreunde*, see also Hartmann Wunderer, 'Der Touristenverein "Die Naturfreunde": eine sozialdemokratische Arbeiterkulturorganisation (1895–1933)', *IWK* 13, 1977, pp. 506–520; Wulf Erdmann and Jochen Zimmer (eds), *Hundert Jahre Kampf um die freie Natur: illustrierte Geschichte der Naturfreunde*, Essen, 1991; Viola Denecke, 'Der Touristenverein "Die Naturfreunde"', in Franz Walter, Viola Denecke and Cornelia Regin, *Sozialistische Gesundheits- und Lebensreformverbände*, Bonn, 1991, pp. 241–291. On the position of women, see Ulrich Linse, "'Frauen und Mädels: Schließt die Reihen!'", *Grüner Weg* 31a 7:4, 1993, pp. 1–5.

24 On the freethinkers, see Wunderer, *Arbeitervereine*, pp. 55–67 and 142–160; Jochen-Christoph Kaiser, *Arbeiterbewegung und organisierte Religionskritik: proletarische Freidenkerverbände in Kaiserreich und Weimarer Republik*, Stuttgart, 1981; and, with care, Daniel Gasman, *The Scientific Origins of National Socialism: Social Darwinism in Ernst Haeckel and the German Monist League*, London, 1971.

25 *Urania* 1:4, 1925, I; TVD: anon., 'Verleger-Sorgen 1931–33', unpublished ms., post-1945 (see p. 11 for the figure of 28 000, and of more than 4 000 even for the last, June 1933, issue).

26 TVD: Fritz Lenke, 'Die Thüringer Verlagsanstalt und Druckerei G.m.b.H., Jena und ihre Tochtergesellschaften: eine Denkschrift zur Liquidation der ehemaligen SPD-Druckereien in Thüringen', 1933. On the socialist press, see further *Kulturwille* 4:12, 1927, Sonderheft 'Verlag'; Kurt Koszyk, *Zwischen Kaiserreich und Diktatur: die sozialdemokratische Presse von 1914 bis 1933*, Heidelberg, 1958; Kurt Koszyk and Gerhard Eifeld, *Die Presse der deutschen Sozialdemokratie: eine Bibliographie*, 2nd edn, Bonn, 1980; Fritz Hüser, 'Literatur- und Kulturzeitschriften der Arbeiterbewegung', in Anne-Marie Fabian (ed.), *Arbeiterbewegung, Erwachsenenbildung, Presse: Festschrift für Walter Fabian zum 75. Geburtstag*, Cologne and Frankfurt/Main, 1977.

27 TVD: Otto Gottschalg, 'Zur Geschichte der Urania-Verlagsgesellschaft m.b.H., Jena und der Monatszeitschrift "Urania"', unpublished ms., post-1945.

28 TVD: Otto Gottschalg, 'Die Organisation der Parteiverlage und Parteidruckereien', unpublished ms., post-1945.

29 Gottschalg, 'Zur Geschichte'.

30 Urania supplied the magazine either directly or through bookshops. In Vienna, *Urania* was among the literature the party peddled door-to-door; see Langewiesche, *Freizeit*, p. 82.

31 Max Kessler (b. 1907, son of a building worker), interview with the author, 19 August 1993. On Kessler, see Heinz Voigt, 'Mir macht das alles Spaß', *Thüringische Landeszeitung*, 21 August 1993; Max Kessler, 'Die Volkshochschule Jena: meine Volksuniversität (1993)', in *1919 bis 1994: 75 Jahre Volkshochschule Jena*, Rudolstadt and Jena, 1994, pp. 321–325.

32 *Urania* 2:4, 1926, 1.

33 UV: Kurt Meister to Helmut Vetter, 21 February 1983 and 19 April 1983; Fritz Otto Barth, "'Urania"-Erinnerungen', about 1986. Barth (1902–1987) was a typesetter, who had also worked as a bookseller and taken the half-year course at the socialist residential college in Tinz Castle. He had held various offices in the cultural organizations of the SPD and been an assistant newspaper editor before he came to Jena; see UV: 'Erinnerungen an die Jenaer Arbeiterbewegung bis zum Faschismus 1933', 3 August 1983.

34 The book and its presentation in Jena are described in Hopwood, 'Biology'.

35 Stadtarchiv Dessau, Nr I/1/4/1/2: Anhaltisches Kreisamt, Abteilung Inneres (Köthen) an d. Ortspolizeibehörden, d. Herren Oberlandjäger, d. Geschäftsstelle in Dessau, 25 May 1933 (thanks to Rüdiger Stutz for drawing this document to my attention); see also Thüringisches Hauptstaatsarchiv Weimar: Volksbildungsministerium (Abt. C), Personalakte Schaxel 376, Bl. 57.

36 Julius Schaxel, 'Rückblick und Ausblick', *Urania* 3:1, 1926, pp. 1–3, on p. 3.

37 Curt Kröber (Berlin-Steglitz), 'Ueber Naturwissenschaft', *Fahrtgenöß* 3, 1922, pp. 108–109, on p. 109; Georg Brunner (Berlin-Neukölln), 'Von vermeintlicher Wissenschaft', *Fahrtgenöß* 3, 1922, p. 125.

38 (Schaxel), "'Urania"'.

39 Julius Schaxel, 'Gesellschaftliche Grenzen der Erkenntnis', *Urania* 7:12, 1931, pp. 367–372, on p. 371.

40 I know of no specific Soviet model for *Urania*, but Schaxel praised Soviet efforts to produce 'Science for All', on which see James T. Andrews, 'N. A. Rubakin and the Popularisation of Science in the Post-October Period', *Russian History* 16, 1989, pp. 9–29.

41 Schaxel in the 1920s was, then, closer to the 1930s 'Bernalism' of the younger British 'visible college' than his much greater verbal radicalism might lead one to expect. But by the mid-thirties, when he was working in the Soviet Union, Schaxel's own position had hardened. See Werskey, *Visible College*; and, for a more engaged review of what was at stake in these debates, The Radical Science Journal Collective, 'Science, Technology, Medicine and the Socialist Movement', *Radical Science Journal* 11, 1981, pp. 3–70.

42 Schaxel, 'Rückblick', p. 2.

43 Schaxel, 'Rückblick', p. 2; Julius Schaxel, 'Die Triebkräfte der Weltgeschichte', *Urania* 6:1, 1929, pp. 1–4, on p. 4. It is crucial to understanding Schaxel's combination of radicalism and compromise that he was in an extremely embattled position with respect to his academic colleagues. Only in the Weimar Republic had it become possible for socialists to be professors, and socialist academics remained isolated in the universities. I focus on the relations between Schaxel's work in the academy and the labour movement in 'Biology'.

44 Schaxel, 'Rückblick', pp. 1–2.

45 Hans Braun, 'Die Serodiagnostik der Pflanzen', *Kosmos* 23, 1926, pp. 289–293. The author was probably the Hans Braun who got his PhD in 1925 and then worked at the Imperial Biological Institute of Agriculture and Forestry in Berlin–Dahlem.

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47 Hugo Iltis, *Volkstümliche Rassenkunde*, Jena, 1930, pp. 19–20; L. H. (possibly Urania-author Lily Herzberg), *Bildungsarbeit* 17, 1930, p. 68; see also Graham, 'Eugenics'.

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65 *Am Wege* 10:6, 1929. This emphasizes the schematic character of Jochen Zimmer's division of *Naturfreunde* into a 'green', neo-romantic, nature-conserving, *Kosmos*-reading wing and a 'red', natural-scientific, *Urania*-reading tendency, for which see his "'Grüne Inseln im Klaskampff?'" Umweltschutzpolitik bei den Naturfreunden zwischen naturromantischer Ethik und sozialpolitischem Engagement', in Erdmann/Zimmer, *Hundert Jahre*, pp. 37–62.

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72 Schaxel to Federbusch, 23 May 1933; see also 'Protokoll der Gesellschafterversammlung der Urania-Verlagsgesellschaft m.b.H. am 17.5.33'. Copies were kindly provided by Gerda Groll

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