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PLASTIC MATERIALS IN POSTWAR CZECHOSLOVAKIA:

A Testimony to Man's Inventiveness and Consumerism

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Plastic materials and products were a truly remarkable phenomenon in the postwar period, influencing not only material reality but, through their symbolic validity, also the value settings of society. The production of plastic materials was a cornerstone of the postwar chemicalisation of industry, and their widespread adoption due to their multiple advantageous properties, led not least to the rapid development of scientific research on polymers. The Czechoslovak Communist regime also sought to exploit the advantages and popularity of plastics ideologically, and positioned them as a symbol supporting the legitimacy of the political course of the time.

"An ordinary glass breaks. This is how it really used to be: ordinary glasses would break. But then several clever heads got together . . . And said: 'Enough!' And it is no coincidence that those clever heads met in Poland. In socialist Poland!" This quote from a cult movie of Czech provenance, Pelíšky (1999), telling a story about the events of 1967–68, refers to a groundbreaking invention—a material which looks like glass but has higher strength, resistance to mechanical damage and, therefore, something made from it featured prolonged, if not unlimited, durability. Their suitable utility properties and low production costs made plastic materials a real breakthrough that, in the postwar world, shaped almost all industrial segments and became one of the most typical features of the onset of the so-called Anthropocene, usually dated to the 1950s, confirmed by a combination of growing industrial production and traffic infrastructure, rising population, surge in tourism, and also the more apparent environmental burden.[1] The development of plastic materials also became one of the benchmarks in the technological and economic race between the East and the West, which also left its mark on everyday life in Czechoslovakia owing to the broad availability and spread of plastic products.

[1] Crutzen, *Das Ende des blauen Planeten?*, 25–48.

This article strives to place the development of plastics within the context of the early days, when mankind, through its activities, actually began to globally influence the Earth's ecosystem, all this in the specific circumstances of a communist regime that applied a thoroughly instrumental approach to science, its achievements and, most importantly, their symbolism. I wish to draw attention to how it sanctified its justifiability and strengthened its power, besides others, through research into polymers and their broad range of use. In return, it induced a consumerist approach to life which the war-exhausted inhabitants appreciated. Paradoxically, the regime tried to win their favour through the same means that "cursed capitalism" used to satisfy Western society. The notion of "plastic" is therefore captured here in its symbolic, iconic level from the perspective of linguistics and semiotics, and in the context of Czechoslovakia's historical and sociocultural realities in the first postwar decades. The basic methodology applied here is that of discourse analysis according to James Paul Gee[2] based on the diachronic approach, that is, surveying the development of the relevant discourses during the period in question. Documentary materials in this case comprise especially extracts from the contemporary press, academic literature, as well as fiction that reflect, amongst others, on plastic in its symbolic value. Archival materials held in the National Archives and the Archives of the Czech Academy of Science are also part of the resources and cannot be omitted.

Plastic materials, artificial or synthetic materials, are polymer compounds made from crude oil or natural gas, formerly also from coal. The word *plast* (the Czech noun for *plastic*) comes from the Greek word *plastós*, meaning "created, fabricated/invented, artificial," the past participle of the verb *plássō*, "[I] create, invent, transform." The term *plasma*, the liquid component of blood, the basic cell matter, also derives from the same word, originally appearing in *plasmacellula*, a "cell product," "cell image."[3] In the nineteenth century, the noun *plastic* was used in Czech natural science terminology as a part of, or layer of, the plant body, that is, the matter or structure from which a plant body is composed.[4] From the viewpoint of semantics, the adjective *plastic* goes even further, meaning "spatial/three-dimensional" and also "illustrative," "malleable," "formable." It came to the Czech language via German (*plastisch*), French (*plastique*), and Latin (*plasticus*), again stemming from the Greek *plastikós*—of or pertaining to creative arts, suitable for artistic copying, etc.[5] The noun *plast* emerged in Czech relatively late,

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2 Gee, *An Introduction to Discourse Analysis*; Gee, *How to Do Discourse Analysis*.

3 Rejzek, *Český etymologický slovník* [Etymological dictionary of the Czech language], 474.

4 Presl, *Počátkové rostlinosloví* [The beginnings of plant terminology].

5 Rejzek, *Český etymologický slovník*, 472.

in the 1960s, when its use was recommended by a Czechoslovak state standard[6] instead of *plastická hmota* (plastic matter) or the abbreviation PH which, moreover, denotes the potential of hydrogen (scale of acidity/basicity of aqueous solutions) in chemistry. The notion *umělá hmota* (artificial matter), then, is an analogy to the German compound *Kunststoff*.

Even though materials that can be ranked as plastic materials in the broader sense (vulcanised fibre, parkesine, celluloid) were being produced as early as in the nineteenth century, the first completely synthetic material appeared in 1907. It was a polyoxybenzylmethyleneglycolanhydride, known as Bakelite, the invention of a Belgian chemist Leo Hendrik Baekeland. The macromolecular matter fashioned by him very quickly and successfully replaced expensive shellac, obtained from the secretions of *Kerria lacca* females and used as a wood stain and impregnation, and in the late nineteenth century found use as a non-conductor and non-flammable material widely applicable, for instance, in telephones, electric switches, radios, etc.[7]

In 1920, the journal *Chemische Berichte* published a groundbreaking article by the German chemist Hermann Staudinger, a 1953 Nobel Prize laureate,[8] which for the first time defined polymers as molecular chains composed of small molecule units linked by chemical bonds, implying that such chains can be produced synthetically. Hermann Staudinger also stood behind the establishment of the very first research centre of macromolecular chemistry in Europe, namely in Freiburg, Germany in 1937.

The development and production of plastic materials was boosted especially by World War II and the shortage of metals for war machinery. Industrial production of synthetic plastics, usually already patented in the interwar period, for military as well as civilian purposes thus began. It included polyvinyl chloride (PVC), polyethylene, polystyrene, polyurethane, polytetrafluoroethylene (known as Teflon) and chloroprene rubber (neoprene). Shortly before the war, Otto Röhm introduced polymethyl methacrylate (Plexiglas) which quickly became used extensively for constructing shelters, aeroplane cockpits, and radars. Polyamide 66 (nylon) was a similar case, used in the production of protective garments, ropes, and parachutes and, last but not least, women's stockings.

A novelty of Czechoslovak origin, created during World War II, was the polyamide Silon, a result of the scientific work of Otto Wichterle, Alois Novotný, and Jiří Procházka. After the closure of Czech universities by the Nazis, the trio of scholars found refuge in the Baťa company's Chemical Research Workshops,

[6] *Plastické hmoty: ČSN 64 0000—československá státní norma (standard)* [Plastic materials: ČSN 64 0000—Czechoslovak state standard].

[7] "Šelak" [Shellac], 262–63; Škeřík, *Plasty v elektrotechnice a elektronice* [Plastic materials in electrical engineering and electronics], 10.

[8] Hopff, "Hermann Staudinger 1881–1965."

where they conceived the technological process to produce a polyamide fibre of poly-caprolactam, known under the trade name Silon, derived from the Czech stem "sil-" (a strong polymer) and "-on" (a suffix analogous to nylon). The name originally considered was Winop, derived from the surnames of the inventors, but Silon eventually turned out to be more viable.[9]

Due to their advantageous utility properties and low production costs, plastic materials became a truly revolutionary phenomenon after the war, making their way into virtually all areas imaginable.[10] Later, in the specific conditions of Communist Czechoslovakia, they quickly found an extensive range of applications, following up on the industrial tradition of the First Republic, and investments of Hitler's Germany made during World War II, especially in the Sudetenland.

The development in chemical research and elsewhere in postwar Czechoslovakia was influenced by an array of factors. These included both the rapid global surge in the importance of natural and technical disciplines led by chemistry, and the country's enforced subjugation to the Eurasian superpower, which brought about, amongst others, destructive interventions into the domestic economy, universities, and science. Without an understanding of the local environment, Soviet advisors implemented a variety of measures which were merely to follow the Soviet model but, in the Czechoslovak environment, usually lacked logic, and caused a profound collapse of the local economy. In this setting, natural and technical sciences were assigned the role of the saviour that was to secure the desired economic productivity, and through that also social development.[11] Science, research, and universities also had to face disorganised and forced changes in their organisation and subject matter. In accordance with the ever-present centralisation, the Czechoslovak Academy of Sciences (ČSAV) was established as the central scientific institution, following the model of the Academy of Sciences of the Soviet Union, and was supposed to replace all the existing learned societies. The specific conditions of Czechoslovak research in all the developing disciplines, however, were not, and could not be, ignored. Thus, although continuity with the former academic institutions was often questioned (for instance the Masaryk Academy of Labour, which had had a technical focus, was to be abolished as an organisation "pro-actively serving the industrial

[9] Smetana, *Jak se dělá věda* [How science is done], 143.

[10] Morris, *A Cultural History of Chemistry in the Modern Age*.

[11] Cf., e.g., *Zápis o poradě předsedů a sekretářů komisí pro vypracování dokumentu „Hlavní směry vědecko-výzkumných prací do roku 1960"* [Record from the meeting of chairpersons and secretaries of commissions to prepare a document entitled "Main Directions of Scientific Research Work until 1960"], MÚA, A AV ČR, *Řízení a správa* ČSAV I, k. 18, sign. 78, Masaryk Institute and Archives of the Czech Academy of Sciences.

bourgeoisie" and helping the "ideological and organisational fragmentation of our science"[12]), it was still apparent in personnel and research matters. What fed the constant tension, however, was the recurring idea of a (strict) division between basic research (ČSAV), applied research (disciplinary institutes), and education (universities), an idea that lacked sense, especially in natural and technical sciences. Despite these politically and ideologically motivated interventions, modest budgets and difficult contact with Western science, Czechoslovak scientists were able to yield results that were comparable in international terms, for instance in biochemistry, photoelasticimetry, microbiology, pharmacology, the development of electron microscopes, macromolecular chemistry, and petrochemistry, a discipline in which Czechoslovakia, along with the German Democratic Republic (so-called East Germany) was the leader within the Eastern Bloc.

East Germany was for postwar Czechoslovakia undoubtedly the most important partner in the research, production, and use of plastic materials, and, in the period in question, was clearly the leader of the Eastern Bloc as regards the volume of plastic materials produced per capita. The Federal Republic of Germany, West Germany, was even the worldwide leader in this. The United States of America was the leader in absolute figures, as was the Soviet Union in the Eastern Bloc; however, both parts of divided Germany were unrivalled in the tons produced per capita.[13]

It is not surprising that the principal events linked to the German plastics industry were greatly reflected in Czechoslovakia. In 1952, a regular fair of plastics and rubber production focused on consumer goods, later also including industrial use of polymer materials. K-Messe was organised for the first time in Düsseldorf, West Germany, and this initially domestic event later turned into a grand international fair, still held today. In the 1950s and later on, the influx of plastic products into every sphere of everyday life could be clearly interpreted in the contemporary context as evidence of progress, or even of the right direction society and ideology was taking especially in the Eastern Bloc countries. A great conference was held with the participation of scholars, politicians, and economists under the slogan of *Chemie gibt Brot—Wohlstand—Schönheit* (Chemistry Brings

[12] *Ústřední kulturně propagační komise a kulturně propagační oddělení ÚV KSČ (19/7), inv. č. 733/4 (Návrhy a zprávy na zřízení ČSAV)*, *Zpráva vedoucího kulturního oddělení ÚV KSČ Václava Pelíška o přípravách k vybudování Akademie věd z 21. 3. 1952* [Report by the head of the cultural department of the Central Committee of the Communist Party of Czechoslovakia, Václav Pelíšek, on the preparatory work to establish the Academy of Sciences, dated 21 March 1952], NA, Ústřední výbor Komunistické strany Československa (ÚV KSČ), National Archives of the Czech Republic.

[13] Richta, *Civilizace na rozcestí* [Civilisation at the crossroads], 175.

Bread—Prosperity—Beauty), in November 1958 in Leuna, an East German town known for its extensive chemical production. Its conclusions were a series of resolutions on increasing the production of artificial fertilisers to provide sufficient agricultural yields, and also of plastic products and synthetic fibres whose variety of colours was expected to break up the drabness that had reigned for years.[14] One of the culminations of East Germany's "plasticisation" was a popular small automobile with a Bakelite body. Its name, Trabant, means "companion," "fellow traveller," "satellite." Serial production was launched in 1958, and at the end of the 1950s, it also started to be sold in Czechoslovakia.

In the sphere of plastics production, the year 1958 was also an important milestone because of the EXPO 58 World Fair in Brussels which, on the one hand, foresaw the far-reaching opportunities for the utilisation of polymer substances in the (near) future, while on the other, paid attention to some traditional materials which, in the case of the Czechoslovak exhibition, was especially glass.[15]

Nevertheless, in Czechoslovakia, too, the production of plastic materials was a cornerstone of the postwar chemisation of industry.[16] While it was a rather marginal industrial segment during the so-called First Czechoslovak Republic, focusing on phenoplast and, in very low volumes, aminoplast and medical resin, it grew approximately sevenfold[17] from 1945 to the mid-1950s. The Exhibition of Plastic Materials, held in Prague in 1950, promoted their practical everyday importance: the use of Bakelite for telephones and radio sets, the forming of boards, tubes, bars, various structural components, etc. from Umakart (HPL), Pertinax, or Textgumold, as well as the replacement of traditional glass with Umaplex (acrylic glass), developed in Czechoslovakia.[18]

The production of plastic materials was primarily centred in the chemical plants in Záluží, near Most, known as the Stalin Plants in 1946–62 and later as the Chemical Plants of the Czechoslovak-Soviet Friendship, then focused on the production of phenol-formaldehyde pressing materials (generally referred

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[14] *Chemie gibt Brot, Wohlstand, Schönheit*.

[15] *Expo 58 v číslech a faktech* [The 1958 EXPO in numbers and facts], 39–40.

[16] *Dokument o rozpracování úkolů a usnesení ústředního výboru Komunistické strany Československa ze dne 7. prosince 1960 o zabezpečení rychlého rozvoje chemického průmyslu ve třetí pětiletce* [Document on the progress in the tasks and resolution of the Central Committee of the Communist Party of Czechoslovakia dated 7 December 1960 on securing quick development of the chemicals industry in the Third Five-Year Plan], MÚA, A AV ČR, fond Sekce III. chemická, k. 4, inv. č. 3, Masaryk Institute and Archives of the Czech Academy of Sciences.

[17] Doležal, *Plastické hmoty* [Plastic materials], 7–8.

[18] Stejskal, *Plastické hmoty úspěšně nahrazují kov* [Plastic materials successfully replace metal], 4.

to as Bakelite in Czech) and Ionexes.[19] Other plants that soon underwent major expansion included Uma in Semtín, Paramo in Pardubice, Fatra in Napajedla, Spolana in Neratovice, Gummon, based in Bratislava, Slovnaft and Matador in Bratislava, Plastika in Nitra, and Závody 1. Mája in Púchov.[20]

After Stalin's death in 1953, as the escalating tensions between East and West slowly began to ease, the attention of the Czechoslovak party and government shifted, at least to some extent, to the population's living standards, a trend which saw many common points with the interests of the chemicals industry, including the manufacture of plastics and plastic products. Their worldwide boom, moreover, went in line with the lack or higher cost of many traditional materials. Much cheaper polymers began to largely replace steel in cars, paper and glass in the packaging industry, and wood in the furniture industry.[21] They became established in the production of clothing, footwear, and household equipment, making fashion and design cheaper and thus accessible to the general public.

Alongside industrial production, chemical research developed, too, within the Czechoslovak Academy of Sciences (ČSAV), at universities of chemistry and in industrial institutes. Some 60% of research tasks were devoted to the chemicals industry, 30% to the power industry, agriculture, and healthcare, and 10% was basic research.[22] In the late 1950s, new research institutes were established, among them one which paid most attention to plastic materials—the ČSAV Institute of Macromolecular Chemistry, soon to become well known to the general public. Its media success is attributed to its founder and first director, Otto Wichterle, who became renowned mostly for his invention of soft contact lenses, and profiled himself especially in the 1960s as a leading representative, almost an icon, of Czechoslovak science.[23]

In response to domestic demand, and also the growing interest in the production and use of plastic materials in East Germany and the Soviet Union, the emphasis on a rapid increase in the production of plastic items was reflected both in the Czechoslovak economy plans as well as in ideological slogans. It was declared in 1958 that the production of plastic materials should rise fourfold by 1965.[24]

[19] Maruška, *Plastické hmoty* [Plastic materials], 9–11.

[20] Cf., e.g., *Plán výroby jednotlivých podniků na rok 1960* [Production plan by enterprise for 1960], NA, fond Ministerstvo chemického průmyslu 1951–1968 (MCHP), k. 503, inv. č. 311, National Archives of the Czech Republic; Maruška, *Plastické hmoty*, 9–11.

[21] Freinkel, *Plastics: A Toxic Love Story*, 4.

[22] Hermann and Olšáková, *Plánování socialistické vědy* [Planning socialist science], 126–31.

[23] Nisonen-Trnka, *Science with Human Face*.

[24] *Zpráva o činnosti ústředního výboru KSČ* [Activity report of the Central Committee of the Communist Party of Czechoslovakia], 33.

The optimistic visions of the late 1950s created a link between all the successes of the regime and the sciences, and the ideas of a new, modernised life that was to facilitate the transition to communism. Plastic products were a tangible and omnipresent symbol of science and progress: "Plastic materials are raw materials from which all modern, improved, practical and elegant goods are produced which can be seen in continually upgraded forms in shopwindows." Even though they became an inseparable part of everyday reality, they were also seen as "materials of the future."[25]

These positive presumptions, however, were rather spoilt due to the lack of raw materials as well as plants that could actually produce plastics. Although in 1960, leading party official Alexandr Dubček was confident enough to proclaim that Czechoslovakia itself had sufficient resources, especially of coal, natural gas, limestone, and pyrite, to secure the much-desired future development of the chemicals industry, in reality it would have been impossible to maintain domestic production at the existing volumes, let alone increase them without supplies of Soviet crude oil and natural gas.[26] This raw material, also nicknamed "black gold," was transported from Central Russia to Europe initially in tanker wagons, but imports were later helped by the Družba (Friendship) pipeline which splits near Mazyr, Belarus into a northern and southern branch. The northern branch connects Poland and Germany, while the southern branch runs to Ukraine, Hungary, and Czechoslovakia. In 1962, the pipeline reached Bratislava and, three years later, northwestern Bohemia, namely the Záluží chemical plant. In 1950, 90% of fuels were produced from coal and 10% from oil, while in 1965, it was the exact opposite.[27]

Owing to this, too, a rapid emergence of plastic materials was seen in the 1960s in other industries, such as metal engineering, transportation,[28] and also the building industry, where the era of prefabricating construction pieces had arrived.[29] Even though the Third Five-Year Plan, or Czechoslovakia's economic development plan for 1961–65, fell far behind expectations and in fact prematurely collapsed, Czechoslovakia remained a far from unimportant player in the production of

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[25] Dubský, "Makromolekulární svět" [Macromolecular world].

[26] *Zabezpečení rychlého rozvoje chemického průmyslu ve třetí pětiletce* [Securing quick development of the chemicals industry in the Third Five-Year Plan], 13.

[27] "Nejen syntetický benzín..." [Not only synthetic petrol…].

[28] Hilken, *Plastické hmoty v dopravě* [Plastic materials in transportation].

[29] Hapl, *Plastické hmoty ve stavebnictví* [Plastic materials in the building industry]. Cf., e.g., *Návrh hlavních směrů základního výzkumu v oblasti přírodních, technických a společenských věd za léta 1964–1970* [Proposal for the main directions of basic research in natural, technical and social sciences from 1964 to 1970], MÚA, A AV ČR, fond Ivan Málek, k. 205, inv. č. 4162, Masaryk Institute and Archives of the Czech Academy of Sciences.

plastic materials.[30] At that time its contribution to the world's plastic production was a whole 1%,[31] with phenoplast and aminoplast prevailing.[32] While in the 1950s this Central European country, separated from the West by the Iron Curtain, was typically known for the development and production of materials for gramophone records (Baklax company),[33] artificial ski bases (Artis and Sulov trademarks), and soft contact lenses, in the 1960s, the production of Czech silicone rubber was launched. Back in the 1950s, the volume of plastic materials produced in Czechoslovakia was four times lower than in East Germany, but in the 1960s, it was less than two times lower.

On the home scene, an extensive portfolio of consumer goods made from polyethylene, polyamide, polystyrene, carbamide, etc., became important, but the growing demand for these could not be satisfied primarily because of shortages of produced materials.[34] Production of goods was discussed with doctors, creative artists and other experts, for instance, pedagogues in the case of toys. This applied, for instance, to Silon washing lines, colour clothes pegs, unbreakable kitchen plates, rubber foam toys, bags, shoe soles, raincoats, flooring, tiling, household switches, combs, ice cube trays for refrigerators (formerly made of aluminium), clothes bags to protect against clothes moths, and mechanical pen cases.[35]

An illustrative event of the period was the so-called PVC Raffle, announced in January 1962 and planned to run for most of the year.[36] People were called on to collect used and unneeded cups, tubes, raincoats, food bags, etc., and bring them to garbage collection points in exchange for raffle tickets.[37] The raffle prizes were again various plastic products such as buckets, beverage containers, washbasins, toy

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30 Cf. e.g., *Stranická skupina 1969–1980, Nástin kritické analýzy politické situace ve vědách přírodních, technických a lékařských zejména v ČSAV (21. srpna 1972)* [Outline of a critical analysis of the political situation in natural, technical and medical sciences especially in the ČSAV, 21 August 1972], MÚA, A AV ČR, fond Sekretariát předsedy ČSAV J. Kožešníka, k. 29, sign. IV, Masaryk Institute and Archives of the Czech Academy of Sciences.

31 Doležal, *Plastické hmoty*, 268.

32 Doležal, *Plastické hmoty*, 271.

33 "Splnili celoroční plán." [They fulfilled the annual plan].

34 *Analýzy, koncepce a perspektivy rozvoje výroby do r. 1980; plastické hmoty* [Analyses, concepts, and perspectives of production development until 1980; plastic materials], NA, fond Ministerstvo chemického průmyslu 1951–1968 (MCHP), k. 484, inv. č. 283, National Archives of the Czech Republic; n, "Nové výrobky z plastických hmot" [New products from plastic materials].

35 Zh, "Příprava plánu na rok 1963" [Preparing the plan for 1963].

36 "Loterie z PVC" [The PVC raffle].

37 Sběrné suroviny, Praha, "Jak se jí pribináček" [Prague garbage collection point, "How to eat a milk dessert"].

cars, and dolls.[38] What is perhaps more interesting, however, was the motivation behind announcing such a raffle. It was not concerned with the environment (as we would expect from today's perspective), but rather due to the chronic shortage of production materials which was the actual impetus for the idea of recycling to appear in the Czechoslovak plastics industry. The environmental aspect, not yet fully realised at the time, was also governed by the fact that reuse of plastic materials is much less demanding in terms of technology and energy than reuse of metals. The issue of manmade materials dispersed far and wide and the difficulty of collecting them for further processing was therefore resolved in an original way, by appealing to human playfulness, for instance also in the form of the PVC Raffle.

Plastic Materials as a Symbol

The Anthropocene was the period when the impact of human activity on the global ecosystem matched that of natural processes, and even surpassed it.[39] Although some scholars mention the year 1820 and the onset of the industrial revolution as the approximate starting point, there is general agreement on the period after World War II in this respect.[40] The achievements of scientific, technical, and technological advances, accelerated by the global war conflict, and their further development contributed to shaping the Cold War, a struggle that took place in political, diplomatic, economic, and ideologically propagandistic arenas. In Czechoslovakia, which after 1948 definitely became part of the so-called Eastern Bloc, the Communist Party, especially in the 1950s, shielded itself with the authority of science and scientists, and made it one of the pillars of its monopoly of power. Science was referred to as being unerring, as it deals with objective research into phenomena, and therefore cannot make mistakes—and neither could the Party. It was, however, necessary to convince society through hard evidence in the form of improving living standards, albeit sometimes only apparently. The quality and comfort of everyday life were to be significantly enhanced, among other things, by plastics and plastic products. Their existence, based on extracting coal and oil, the construction of petrochemical plants, and the management of waste from production up to the collection of non-degradable plastic waste and the spread of microplastics into all environmental components, was a major influence on the onset of the Anthropocene. In the Eastern Bloc, the effort to catch up with the West and suppress the trend of disapproving

[38] *Pražské zpravodajství*, "Prosté losy jsou za všechny plastické hmoty." [*Prague News*, "Raffle tickets for every plastic material"].

[39] Hrdina and Romportl, "Current Global Land Systems Classification."

[40] McNeill and Engelke, *The Great Acceleration*.

comparisons with countries beyond the Iron Curtain was generally a strong motivation to increase the production of plastics.[41] This led to ever-growing pressure on the chemicals industry to "supply fuel" to meet the requirements. The importance of science and the trust placed in it therefore became the key rhetoric of the regime, and academic notions turned into influential symbols. In such a setting, especially during the first Cold War years and decades, it was practically impossible to pay (greater) attention to Anthropocene-related environmental aspects and their adverse impact on man, who obviously saw the greatest existential threat to it in the weapons of mass destruction, wielded by the leaders of the bipolar world. As presented by official propaganda, only science offered a solution—it was in fact science that had brought up these risks, but could all the more be the only one to offer a relevant way out.

Plastic materials and products in 1945–70 were a truly noteworthy phenomenon which influenced not only the material reality, but—through their symbolic value—also the values of society. Seen first as a replacement, the importance of synthetic polymer materials was soon reassessed because of the many benefits they provided, enabling the manufacture of products whose strength, lightness, and low cost surpassed all the natural materials used so far, as well as metals.[42]

> Plastic materials are a real fairytale material with unseen combinations of properties. Diverse plastic materials have the strength of steel, resistance of iron, transparency of glass and lightness of feathers, the flexibility of rubber and are as nonconductive as porcelain.[43]

The basic premise was that a suitably chosen structure of the plastic material and, last but not least, its appropriate colour may completely force other materials out of their traditional domains.[44] Over time, their versatility shifted plastic materials into areas that had been hard to imagine before: "Plastic as a raw material is ideal for the production of artificial snow, lawns, flowers and other items."[45]

Flexibility, plasticity, elasticity, the almost endless potential of formation—all this made it possible to create virtually any shape and any item, and thus opened the door to a happy future that even contemporary generations would be able to

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41 Despite strict security on the state border, especially towards the West, there were still many people who were allowed limited access to Western countries. Academicians were among the privileged ones.

42 "O urychlení rozvoje chemického průmyslu" [On accelerating the development of the chemicals industry].

43 Plonskij, "Věda, mír, komunismus" [Science, peace, communism].

44 Hlavová, "Confidential!"

45 Rubín, "Chemie a trik ve filmu" [Chemistry and effects in film].

enjoy: "What took nature millions of years was formed in a mould under pressure in a few minutes."[46]

A certain differentiation in the approach to the benefits of the new materials was seen, interestingly, but not surprisingly, in gender: while women appreciated a clean surface without sharp edges that required no demanding maintenance, men were more interested in the mechanical resistance, product lifetime and safety.

The (alleged) high aesthetical value of plastic products, in no way impairing their functionality, was also promoted in the 1950s:

> My dear beauty in a raincoat and with a glossy handbag, do you know that what you are wearing is—just imagine!—coal converted into polyvinyl chloride. In short—PVC. And now you see how much this 'coal' becomes you! And also how well it serves.[47]

Not only their advantageous physical properties, but also the appearance of plastics symbolised progress, modernity, an economically measurable basis of developed civilisation, seemingly ahead of the West:

> Even after a short time, our women have had a favourable experience with polyethylene products and are highly interested in them... Other items will be made from polyethylene and available in the market, too, for instance, curtains, now just single-coloured or with a printed pattern, and tablecloths and aprons which, for their highly practical properties, are bound to become the greatest attractions of the season.[48]

This was associated with the rich variety of colours, including shiny ones, that could be used in plastics to thereby define the modern, mass taste of the socialist society, a taste which, through the diversity of colours, evoked the positive aspects of the times:

> Now the gardeners, thirteen of them here, are preparing for 130,000 sq.m. (wow!) of garden design in the exhibition area; they are preparing various types of canna lily, aster and begonia in modern colours, as if they wanted to compete with the colour range of plastic materials, neon and lights…[49]

As far as aesthetic value is concerned, it needs to be mentioned that as early as in the 1920s and 1930s, the Art Deco style was influenced, amongst others, by

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[46] Růžičková, *Plačící strom* [The weeping tree], 93.

[47] Veselá, "Krása z uhlí" [Beauty made from coal].

[48] Ks, "Igelit."

[49] Štuka, "Dobývání města." [Conquering the town].

Bakelite, then a new material, which was used, for instance, in the manufacture of electrical appliances until the 1950s. The artistic value of the postwar serial production of plastics typically fell far below the quality of interwar experiments with new polymer materials; however, the repute of plastics was, to some extent, remedied through the rise of the so-called Brussels style, which abundantly and creatively worked with various types of laminated plastic, Umakart, polyvinyl chloride, and polyethylene, and owing to them, too, could employ a wide range of particularly bright and pastel colours. Typical, almost iconic artefacts of the turn of the 1950s/1960s (and also later) became, for instance, the red and grey seats made from laminated plastic for T3 trams, the squeaking rubber toys by the designer Libuše Nyklová, and hard shell chairs and other pieces of furniture designed by Miroslav Navrátil.

The positive prospects were well supported by properties such as durability, resistance, indestructibility, pertaining not only to the material and the product, but at the symbolic level also to the condition of society living in the correctly chosen direction, in a state of progress guaranteed by the Communist Party and the regime it had established. What suited the regime's interests was also the unification of social and economic needs and the taste of its citizens, all outlined stereotypically, without more apparent signs of creativity, just like the majority of consumer goods coming off production lines, not only those made of plastic. The mass supply of polymer products soon unified the appearance of most Czechoslovak households—with apartments in prefab residential blocks, this included even the built-in core components, such as bathrooms mostly made of Umakart.

All of the aforementioned benefits, topped off by the low price, predetermined plastic materials to become the stimulator of consumer behaviour and consumerism. Not only were existing products redesigned using new materials, many other items also appeared that either had not existed before or had been considered luxury goods available only to well-off households. These items included, for instance, window blinds, magazine holders, trays for glasses, bread containers, etc. Lectures were held for experts as well as the general public on the modernity and progressivity of plastics in everyday life, including, for instance, a series of lectures held by the Museum of Applied Arts in Prague under the title *Plastic Materials and Their Use in Production*. Among the most attractive topics was "The Kitchen And Its Plastic Furnishings."[50] Considerable room was also provided for plastic materials and products in lifestyle magazines such as *Domov* (Home), which clearly set the trend for the extensive use of plastics in interior design, thus stimulating customer interest. The Scandinavian style, whose popularity saw a sharp surge in

[50] *Různé zprávy*, "V rámci cyklu plastické hmoty a jejich využití ve výrobě" [*Various News*, "Part of the series plastic materials and their use in production"].

the twenty-first century, was already being promoted in Czechoslovakia in the 1950s and 1960s, all the more because of the fact that it did not come from the West but from the neutral North, whose socialist policies made it appear to some degree as a partner system for the Communist regime.[51]

One of the repeatedly mentioned merits of plastic materials, often highlighted during the period in question, was their safety, an aspect evident, for instance, in electrical cables. They were formerly insulated in jute. After the war, this was replaced with PVC, a material which excelled in its non-flammability, thus significantly reducing the risk of cable damage and also prolonging its lifetime more than threefold. Moreover, the possibility to produce cable insulation in various colours brought the advantage of colour marking of cables according to voltage and cross-section.[52] The need for safety and security became much more pressing after World War II and in the reality of the quickly emerging Cold War. The instrumental capture of man's basic biological and psycho-social needs is actually typical for propaganda and manipulation, and it was no different in the extensive propaganda campaigns of the Czechoslovak Communist Party. In an atmosphere of fear, purposely maintained and abused by the regime, every artefact linked in any way to a feeling of safety was welcomed and appreciated by society. Plastic materials were thus not only a practical, technical guarantee of safety, but also provided a psycho-social guarantee.

The 1960s also saw the emergence of a critical view of artificial, plastic materials and products for the first time, especially in the context of them being a mere replacement for things that were real, natural, and had their own meaning. Plastics thus represented a kind of illusion, fiction, an empty form which lacks meaningful substance:

> We are living in a world where we increasingly face fakes, substitutes, imitations, an artificial acceleration of cycles which we even try to impose on nature itself. In this world, where manmade materials pretend to be real leather and mass culture pretends to be real art, literature, too, finds itself in an experimental stage. It craves to create synthetic, artificial visions of the world…[53]

They also impersonate untrueness, mendacity and delusion in creative work, ordinary life, interpersonal relationships, and one's relationship to oneself: "Our curtains caught fire one day... But they didn't burn, they only smouldered. Some

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[51] Kvasničková and Kvasnička, "Kultura bydlení ve Švédsku" [The housing culture in Sweden].

[52] "Nehořlavé elektrické kabely" [Non-flammable electrical cables].

[53] "Kruhy v písku. O dnešní polské próze" [Circles in the sand. On contemporary Polish fiction].

plastic stuff or whatever garbage. Everything is plastic today, even emotions."[54]

The aspect of the formability and unlimited adaptability of plastics no longer evoked just the broad possibilities of making virtually any type of product that would facilitate everyday life and boost living standards, but also correlated to society's full acceptance of the ideas and requirements declared by contemporary ideology whose detrimental effects were becoming increasingly apparent: "In transformations, one usually tends to overestimate the adaptability of people, which often leads to complications in their life."[55]

It is not without interest that one of the "fathers" of plastics, Otto Wichterle, expressed apparent displeasure with plastics making their way into some specific areas dominated previously, for instance, by glass or porcelain: "Shapes that look ordinary with traditional materials may appear ugly with plastic materials, and sometimes even hinder their flawless function . . . Nothing which defies the rules of the material when being formed is attractive."[56] Although initially not frequent, complaints about the sanitary and healthcare shortcomings of plastic materials were voiced:

> Just look at your kitchen, plastics everywhere, Bakelite and PVC, and porcelain only appears on the table at Christmas, it is just not healthy. No one can deny that the yellow PVC plates look bad, the food goes cold quickly and the surface is somewhat sticky . . . I think that no plastic is a substitute for the beauty inherent in our porcelain, and neither should people buy ties with deer.[57]

Far from everyone was comfortable with the mushrooming "plastic epoch":

> I must have my environment, my old friend. A heavy table made of oak, natural oak of course, an old leather armchair, . . . and I don't like plastic items on tables . . . I don't like them at all. When there is plastic in a room where I am, I cannot stand it, you know! Just a tea spoon is enough. And it doesn't even need to be visible.[58]

Although plastics were generally seen as hygienic because they were easy to wash and take care of, it cannot be denied there was a certain awareness of the harmful effects of some of them. As early as in 1950, for instance, a ban was introduced in the food industry and related sectors on softened polyvinyl chloride, also known as "German plastic," supplied from the mid-1930s by the German manufacturer IG Farben (hence the popular and still used term Igelit). Evidence was already

[54] Henryková, Fantazie pro němou lyru [Fantasy for a mute lyre], 69.

[55] čtk, "Sociologie odhaluje města vdov" [Sociology unveiling towns of widows].

[56] Hlavová, "Hovoříme o plastických hmotách" [Speaking about plastic materials].

[57] Branald, *Promenáda s jelenem* [Promenade with a deer], 409.

[58] Fiala, *Pstruzi pod kamenem* [Trout under a stone], 10.

available that it released tricresyl phosphate, a proven neurotoxin that can even cause death. It must be noted, however, that the German Igelit was a different product that has nothing in common with the polyethylene film termed Igelit in the Czech Republic today.[59]

Seen from today's perspective, we could have expected the 1960s, increasingly critical of the existing conditions, including environmental topics, to at least partially make amends with society for the negative effects of plastics and their production on the environment. First, it was still too early for systematic scientific research into the toxic effects of plastics and microplastic particles spreading in nature, or the unfortunate dumping of hard-to-decompose or impossible-to-decompose plastic waste; second, the extensive coal mining, detrimental to the landscape especially in northwestern Bohemia and northern Moravia, was now linked primarily to the power industry, as in the 1960s, coal had already largely been replaced in plastics production by imported crude oil. So even though ecology was mentioned in the context of plastics, it usually employed the reverse argument—that is, pointing out the lower exploitation of wood and other raw materials. In 1961 alone, for instance, Svit, the largest footwear manufacturer in Czechoslovakia, produced 4.5 million pairs of heels from polyamide, thereby saving 3,000 m^3 of beech wood, the equivalent of approximately 1,500 hectares of forest.[60] It was also presumed that the annual Czechoslovak production of plastic materials would reach almost 14 kg per capita in 1965,[61] while nobody paid adequate attention to issues related to waste, dump sites, decomposition time, or recycling. It needs to be emphasised, however, that nowhere in the world at that time disposed of sufficient tangible evidence and underlying documents to raise awareness about how serious the problem was. The year 1965, for example, was the first time that plastic waste was found in the ocean, when a plastic bag was caught on the Irish coast in the Continuous Plankton Recorder, a device which has been monitoring plankton communities since 1931.[62]

It should be noted in connection thereto that although it is capitalism which

[59] In the late 1930s, the Czechoslovak enterprise Fatra Napajedla started to use German technology to produce softened PVC known as Igelit, also called Fatrofan or Fatrokol by the specific plant, for use in raincoats, shoes and bags. The same enterprise, however, began to process various types of polyethylene in the 1950s, including so-called low-density polyethylene for food bags or light shopping bags, now commonly known under the popular names Igelit bag and Igelitka.

[60] "Podpatky z nových hmot" [Shoe heels from new materials].

[61] "Odkrýt všechny rezervy zvýšení produktivity práce: Z projevu soudruha inž. Otakara Šimůnka" [Uncover all reserves to increase work productivity. From a speech by Comrade Otakar Šimůnek].

[62] Victoria Gill, "Early Ocean Plastic Litter Traced to 1960s," *BBC*, April 16, 2019, https://www.bbc.com/news/science-environment-47914580.

is primarily linked to consumerism and reckless consumer behaviour,[63] and which, from its substance, placed and places pressure on production, effectiveness, and gaining sources of energy, the approach of the so-called socialist systems was no different. Exploitation of the environment during the Cold War occurred shamelessly on both sides of the Iron Curtain.

An interesting example of the contemporary criticism from certain echelons of society regarding the blind acceptance of materialist culture could be seen in the name and music of the Czechoslovak underground band Plastic People of the Universe. It was founded in 1968, drawing inspiration for the band's name from Frank Zappa's composition *Plastic People* (1967), a kind of manifesto against the American establishment and also against consumerist behaviour, symptomatically symbolised by ever-present plastic.[64]

Conclusion

In the postwar world, plastics became a multifaceted symbol permeating the everyday life of all of society and influencing the perception of many topics, from scientific research to ecology. As a modern-era phenomenon, in many respects they made life for countless people easier and of a higher quality, and offered them a cheaper alternative to many items and services unavailable until then. Their universal nature, wide range of use, and almost unlimited formability in time helped them to transition from being a replacement for more expensive or less available materials to achieving an independent functionality and aesthetic value. The mass spread of plastics also led to the rapid development of scientific research into polymers. It is apparent that such a contextual basis could in no way slow down industrial development, which today is inevitably heading towards fulfilling the prognosis that around the mid-21st century, the weight of plastics in the world's oceans will exceed that of fish. It is especially due to plastic materials that a new geological layer on Earth is being created, as plastics are becoming an increasingly more important component of sedimentary layers.[65] And while the decomposition time of some types of plastics ranges within a span comparable to human life and can be directly observed (thin polyethylene bags for fruit or pastry available freely in shops decompose in approximately 25 years), for most polymer-based materials this issue is much more serious. PET bottles or disposable diapers will take hundreds of years to decompose, and the estimates for polystyrene range

[63] Haq and Alistair, *Environmentalism Since 1945*.

[64] Jirous, *Pravdivý příběh Plastic People* [The true story of the plastic people].

[65] Westermann and Höhler, "Writing History in the Anthropocene"; Moldan, *Podmaněná planeta* [The subjugated planet].

from ten thousand years to *never*. An even greater problem than deposition of waste which decomposes very slowly or not at all is the release of microplastic particles that are harmful to people's and animals' health.

The environmental consequences of the chemicals industry began to arise as early as in the 1980s,[66] when the global volume of produced plastics reached billions of tons. This was, however, preceded by years to decades dominated by the intoxicating ideas of above-standard living standards for everyone that could be achieved, amongst others, by new materials with a multitude of benefits. The ideas, and even more so the physical artefacts, that seemed to be the realistic foundation for a happy future, were exceptionally important after World War II and in the gloomy setting of the Cold War. The optimistic idea of plastics that would never cease to surprise everyone with their versatility and omni-functionality permeated all of society in 1945–70, strengthened its cohesion and hope for a better future. At the same time, however, it greatly served the Communist regime, which skilfully used its potential to reinforce itself. So it may appear symptomatic that the escalating crisis of the bipolar world that led to the downfall of the Iron Curtain and, in Czechoslovakia, to the so-called Velvet Revolution at the end of the 1980s was boosted, amongst others, by the apparent decline in the belief in the saviour that was plastics, whose untouchable position after the war became less and less relevant with the emergence of systematic environmental research and environmental approaches to life.

Biography

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Bibliography

Branald, Adolf. *Promenáda s jelenem* [Promenade with a deer]. Prague: Československý spisovatel, 1966.

Chemie gibt Brot, Wohlstand, Schönheit: Chemiekonferenz des ZK der SED und der Staatlichen Plankommission in Leuna am 3. und 4. November 1958 [Chemistry brings bread, prosperity,

[66] For Czechoslovakia, cf., e.g., Hadač, Moldan, and Stoklasa, *Ohrožená příroda* [Endangered nature].

beauty: Chemistry Conference of the Central Committee of the Socialist Unity Party and the State Planning Commission in Leuna on 3–4 November 1958]. Berlin: ZK der SED, Abteilung Agitation und Propaganda, 1958.

Crutzen, Paul J. *Das Ende des blauen Planeten? Der Klimakollaps; Gefahren und Auswege.* Munich: Beck, 1991.

čtk. "Sociologie odhaluje města vdov" [Sociology unveiling towns of widows]. *Lidová demokracie* 121 (1966): 1.

Doležal, Vladimír. *Plastické hmoty.* Second edition. Prague: Státní nakladatelství technické literatury, 1965.

Dubský, Václav. "Makromolekulární svět" [Macromolecular world]. *Věda a technika mládeži* 24 (1962): 834–35.

Expo 58 v číslech a faktech: Doklady a dokumentace o úspěších zemí tábora míru na Světové výstavě v Bruselu [The 1958 EXPO in numbers and facts: Evidence and documentation of the successes of the peace bloc countries at the World Exhibition in Brussels]. Prague: Československá obchodní komora, 1959.

Fiala, Pavel. *Pstruzi pod kamenem* [Trout under a stone]. Liberec: Severočeské nakladatelství, 1968.

Freinkel, Susan. *Plastics: A Toxic Love Story.* New York: Henry Holt, 2011.

Gee, James Paul. *An Introduction to Discourse Analysis: Theory and Method.* Second edition. New York: Routledge, 2005.

Gee, James Paul. *How to Do Discourse Analysis: A Toolkit.* Second edition. New York: Routledge, 2014.

Hadač, Emil, Bedřich Moldan, and Jaroslav Stoklasa. *Ohrožená příroda: Biosféra—člověk—technosféra* [Endangered nature: Biosphere—man—technosphere]. Prague: Horizont, 1983.

Hapl, Ladislav. *Plastické hmoty ve stavebnictví* [Plastic materials in the building industry]. Prague: SNTL, 1964.

Haq, Gary, and Alistair Paul. *Environmentalism since 1945: The Making of the Contemporary World.* Second edition. New York: Routledge, 2013. https://doi.org/10.4324/9780203803875.

Heinrich, Hopff. "Hermann Staudinger 1881–1965." *Chemische Berichte* 102 (1969): XLI–XLVIII. https://doi.org/10.1002/cber.19691020502.

Henryková, Jitka. *Fantazie pro němou lyru* [Fantasy for a mute lyre]. Prague: Svoboda, 1968.

Hermann, Tomáš, and Doubravka Olšáková, eds. *Plánování socialistické vědy: Dokumenty z roku 1960 ke stavu a rozvoji přírodních a technických věd v Československu* [Planning socialist science: Documents dated from 1960 on the state and development of natural and technical sciences in Czechoslovakia]. Červený Kostelec: Pavel Mervart, 2013.

Hilken, Ivar. *Plastické hmoty v dopravě* [Plastic materials in transportation]. Prague: Nakladatelství dopravy a spojů, 1961.

Hlavová, Zdena. "Confidential!" *Domov: Kultura bydlení, architektura, umění, design, styl* 3 (1963): 17.

Hlavová, Zdena. "Hovoříme o plastických hmotách" [Speaking about plastic materials]. *Domov: Kultura bydlení, architektura, umění, design, styl* 2 (1960): 49–50.

Hrdina, Aleš, and Dušan Romportl. "Current Global Land Systems Classifications: Comparison of Methods and Outputs." *AUC Geographica* 57, no. 1 (2022): 48–60. https://doi.org/10.14712/23361980.2022.5.

Jirous, Ivan Martin. *Pravdivý příběh Plastic People* [The true story of the plastic people]. Praha: Torst, 2008.

"Kruhy v písku: O dnešní polské próze" [Circles in the sand: On contemporary Polish fiction]. *Světová literatura* 5 (1967): 233–36.

Ks. "Igelit." *Lidové noviny* 58, no. 288 (1950): 2.

Kvasničková, Rajisa, and Ilja Kvasnička. "Kultura bydlení ve Švédsku" [The housing culture in Sweden]. *Domov: Kultura bydlení, architektura, umění, design, styl* 2 (1960): 35–38.

"Loterie z PVC" [The PVC raffle]. *Lidová demokracie* 11 (1962): 11.

Maruška, Josef. *Plastické hmoty* [Plastic materials]. Prague: Státní nakladatelství technické literatury, 1956.

McNeill, John R., and Peter Engelke. *The Great Acceleration: An Environmental History of the Anthropocene since 1945.* Cambridge, MA: Belknap Press of Harvard University Press, 2016. https://doi.org/10.2307/j.ctvjf9wcc.

Moldan, Bedřich. *Podmaněná planeta* [The subjugated planet]. Prague: Karolinum, 2009.

Morris, Peter J. T., ed. *A Cultural History of Chemistry in the Modern Age.* London: Bloomsbury Publishing, 2023.

"Nehořlavé elektrické kabely" [Non-flammable electrical cables]. *Lidová demokracie* 4 (1962): 1.

"Nejen syntetický benzín..." [Not only synthetic petrol…]. *Rudé právo* 131 (1965): 1.

Nisonen-Trnka, Riikka. *Science with Human Face: The Activity of the Czechoslovak Scientists František Šorm and Otto Wichterle during the Cold War.* Tampere: University of Tampere, 2012.

"Odkrýt všechny rezervy zvýšení produktivity práce: Z projevu soudruha inž. Otakara Šimůnka" [Uncover all reserves to increase work productivity. From a speech by Comrade Otakar Šimůnek]. *Rudé právo* 153 (1960): 2.

Plastické hmoty: ČSN 64 0000 – československá státní norma (standard) [Plastic materials: ČSN 64 0000 – Czechoslovak state standard]. Prague: Úřad pro normalisaci, 1952.

Plonskij, Alexandr F. *Věda, mír, komunismus* [Science, peace, communism]. Prague: Státní nakladatelství politické literatury, 1960.

"Podpatky z nových hmot" [Shoe heels from new materials]. *Lidová demokracie* 180 (1962): 3.

Presl, Jan Svatopluk. *Počátkové rostlinosloví* [The beginnings of plant terminology]. Prague: Kronberger and Řivnáč, 1848.

Pražské zpravodajství. Sběrné suroviny, Praha. "Prosté losy jsou za všechny plastické hmoty" [Prague News. Prague garbage collection point: Raffle tickets for every plastic material]. *Lidová demokracie* 30 (1962): 4.

Rejzek, Jiří. *Český etymologický slovník* [Etymological dictionary of the Czech language]. Voznice: Leda, 2012.

Richta, Radovan. *Civilizace na rozcestí* [Civilization at the crossroads]. Prague: Svoboda, 1967.

Rubín, Jindřich. "Chemie a trik ve filmu" [Chemistry and effects in film]. *Věda a technika mládeži* 15 (1960): 463.

Růžičková, Olga. *Plačící strom* [The weeping tree]. Prague: Státní pedagogické nakladatelství, 1965.

"Různé zprávy. V rámci cyklu plastické hmoty a jejich využití ve výrobě" [Various News. Part of the series plastic materials and their use in production]. *Lidová demokracie* 288 (1956): 3.

Sběrné suroviny, Praha. "Jak se jí pribináček" [Prague garbage collection point: how people eat pribináček]. *Lidová demokracie* 175 (1961): 7.

Smetana, Miroslav. *Jak se dělá věda* [How science is done]. Prague: Orbis, 1965.

Škeřík, Jan. *Plasty v elektrotechnice a elektronice* [Plastic materials in electrical engineering and electronics]. Prague: SNTL, 1991.

"Splnili celoroční plán" [They fulfilled the annual plan]. *Rudé právo* 275 (1947): 1.

"Šelak" [Shellac]. *Z říše vědy a práce: Volné rozhledy na poli průmyslu, obchodu a řemesel* 17 (1895–1896): 262–63.

Stejskal, Vladimír. "Plastické hmoty úspěšně nahrazují kov" [Plastic materials successfully replace metal]. *Lidová demokracie* 38 (1950): 4.

Štuka, Ivo. "Dobývání města" [Conquering the town]. *Československý voják* 8 (1959): 20–21.

Veselá, Drahomíra. "Krása z uhlí" [Beauty made from coal]. *Květy* 2 (1956): 14.

Westermann, Andrea, and Sabine Höhler. "Writing History in the Anthropocene." *Geschichte und Gesellschaft* 46, no. 4 (2020): 579–605. https://doi.org/10.13109/gege.2020.46.4.579.

Zh. "Příprava plánu na rok 1963" [Preparing the plan for 1963]. *Lidová demokracie* 229 (1962): 3.

Zpráva o činnosti ústředního výboru KSČ XI. Sjezdu a současné hlavní úkoly. Referát prvního tajemníka ÚV KSČ soudruha Antonína Novotného [Activity report of the Central Committee of the Communist Party of Czechoslovakia for the 11th Congress and the Main Contemporary Tasks. A Speech by the First Secretary, Comrade Antonín Novotný]. Prague: Ústřední výbor KSČ, 1958.