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CONTROLLING THE PRODUCTION AND DISTRIBUTION OF DRUGS IN COMMUNIST POLAND

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SUMMARY

CONTROLLING DRUGS IN POSTWAR POLAND

Between 1944 and 1989 – the period of communist power in Poland – the national pharmaceutical market experienced several dramatic changes. The country was a prodigious importer of drugs following the Second World War, with a large portion of the medicine received being donated by various aid organisations. In the 1960s, Poland became a significant exporter of drugs to the Eastern Bloc countries, but dropped down the list of meaningful producers again after the post-1989 transformation. For four and a half decades the pharmaceutical market in Poland had been a scene of political and ideological struggle. The companies, owned and controlled by the state, were poorly managed, being neither innovative nor competitive. This fact, along with the state's irrational and inconsequent drug policy, caused an almost permanent shortage in drug supplies for patients: ironic for a socialist system in which universal and free health care was a basic principle.

The historiography of the development of the pharmaceutical industry and drug policy in postwar Poland needs thorough revision. The majority of works published before the democratic transformation of 1989 must be considered politically biased. This also applies to corporate stories of individual factories or federations of pharma-

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ceutical manufacturers published both before and after the change, which constitute the majority of the existing historiography[1]. The most comprehensive account of the history of the Polish pharmaceutical industry is the work of Kurkowska-Bondarecka (1995), but this is concise and anything but critical[2]. The complex story of the communist takeover of the industry and the beginnings of state controlled drug distribution is dealt with by Elżbieta Rutkowska (2009) but this study is limited geographically to three provinces[3].

This paper defines the following research question: how did the drug policy in postwar Poland evolve, and what were the tools exercised to control the pharmaceutical market? Strong political and ideological factors evidently affected this process. A question which immediately emerges is how the ideological dogmas and confronting interests of different groups influenced drug policy, production management and R&D strategies. Other issues which require analysis are the export/import policies regarding medicine, how these were balanced in view of chronic shortages on the domestic market, and how the pharmaceutical industry in Poland adapted to a free market economy after the democratic changes of 1989.

Reconstruction through destruction

Free health care for all citizens was one of the promises made by the Polish communist government shortly after the war. Prior to 1939, access to medical assistance was the privilege of a small part of the population; therefore, fulfilling this promise was extremely important for the communists from a propagandistic point of view. Twenty per cent of the population perished during the Nazi occupation and the health of those who survived was perilous. Diseases were rampant, some exceeding the epidemic threshold. The people were malnourished and living in terrible housing conditions.

However, providing all citizens with free health care was a tremendous challenge. Medical staff had been decimated by the Nazis, and

many hospitals and clinics had been destroyed. For the plan to succeed it would also be necessary to ensure a supply of drugs on a scale the country had never witnessed before.

Meanwhile, the pharmaceutical industry lay in the rubble. The capital city of Warsaw, where, before the war, eighty per cent of national drugs had been produced, was in ruins, and so was the industry. Even if these plants could be quickly reconstructed, their pre-war capacity had only covered around thirty per cent of domestic demand[4].

Given the growing demand, importation of medicines from abroad increased further, reaching eighty-five per cent of annual consumption in 1948[5]. Taking into account deliveries from the United Nations Relief and Rehabilitation Administration (UNRRA) and charitable organisations, this dependence on foreign supplies was even more significant.

A picture of the Polish pharmaceutical market during the first year and a half after the war would not be complete without the so-called "German inventories". This term describes drugs obtained from abandoned pharmacies in the former German lands incorporated into Poland[6].

Poland could not afford to import drugs on such a scale in the long run due to a lack of foreign currency. Thus, the only solution was to intensify development of the production capacity of the national pharmaceutical industry. The communist regime's intents, however, were that this would be entirely state owned. The private sector did not receive any support from the state during the immediate postwar reconstruction. Moreover, some private companies, which resumed production and started to rebuild their position on the market relatively quickly, were taken over by so-called compulsory state management. Significantly, this happened before nationalisations came into effect in 1950.

The process of this premature nationalisation began shortly after the provisional communist government was formed on 22 July 1944 in Lublin, east of Poland. Representatives of the Ministry of Industry and Trade (Ministerstwo Przemysłu i Handlu) entered the liberated

territories of what would be Poland once the war was over, after the Red Army, to take control of the major industrial plants. These scouts had to keep production going, or at the very least, safeguard machinery from being plundered by the looters or confiscated by the Soviets. The industries of the highest importance to a broadly defined national interest were immediately taken under compulsory state management[7]. The pharmaceutical industry was at the top of this list.

For most of these new acquisitions the Ministry appointed new directors, typically communist party activists. They were not always familiar with the technological regime used in a particular facility, but were at least loyal to the new government. Ironically, in some of those "compulsory-managed" pharmaceutical plants the former owners were hired as temporary managers.

There were, however, some remnants of the private pharmaceutical industry, which avoided this premature nationalisation during the initial postwar months. Some of these drugs makers retained at least temporary control over their property, and quickly re-launched production of some basic medications, often selling them under brand names which had been known to Polish patients bofore the war. However, these initiatives were already doomed. In the logic of Communist ideologists, only state-owned and centrally-controlled industry could meet the ambitious plans to provide Poles with the medications they needed.

The organisational chart for the state-owned pharmaceutical industry changed several times after 1945, before stabilising in the early 1960s. At first, control over the factories under compulsory state management was assumed by the Central Board of Chemical Industry (Centralny Zarząd Przemysłu Chemicznego – CZPCh), which had its headquarters in the Silesian town of Gliwice. As of 1 March 1947, this responsibility was transferred to the newly formed Federation of Pharmaceutical Industries (Zjednoczenie Przemysłu Farmaceutycznego – ZPF) in Kraków[8], which was transformed into

the Central Board of the Pharmaceutical Industry (Centralny Zarząd Przemysłu Farmaceutycznego – CZPF) three years later. In 1961, all major state-owned pharmaceutical plants merged to form the Federation of Pharmaceutical Industries, "Polfa".

While control over state-owned factories had been centralised and tightened over the early postwar years, governmental policy toward the private sector remained ambiguous. On one hand different officials were seemingly convinced of the advantages of the private initiative, but on the other hand the communist government steadfastly pursued the elimination of private ownership on ideological grounds.

Representatives of the Ministry of Health (Ministerstwo Zdrowia) and the National Institute of Hygiene (Państwowy Zakład Higieny – PZH)[9] – people who generally originated from the medical profession – had a very practical attitude towards private enterprises. They were more concerned with the availability of drugs than the ideological correctness of factory directorates.

The fiercest opponents of the private sector were officials of the Ministry of Industry and Trade, and the State Economic Planning Commission (Państwowa Komisja Planowania Gospodarczego – PKPG), who were typically active members of the communist party. For these apparatchiks the domestic pharma was yet another area of ideological struggle.

Over time the conflicts of interest between different actors began to emerge. The Ministry of Health imagined the national drug policy differently from the Ministry of Industry and Trade, while the producers' federations also had their own interests. To avoid tensions and improve decision-making, the government established the Co-ordinating Committee for Drug Management Affairs, which embraced representatives of all these bodies.

The meetings of the Co-ordinating Committee were spectacles of hypocrisy. While the discussants usually emphasised that the flexi-

bility and marketing skills typical of private companies were the features helping to meet the needs of the most urgent patients, they also considered them a threat to the state-owned enterprises. Practically all meetings of the Co-ordinating Committee ended with an appeal to eliminate the private sector of the pharmaceutical industry.

The determination of the Polish Workers' Party activists to take firm state control of pharma was considerable[10]. In June 1948, while opening a meeting of the Co-ordinating Committee, Adam Wang, a hard-line communist from the Department of Planning in the Ministry of Industry and Trade, made a pronouncement: "We need to think of what exactly we need to plan"[11]. Wang urged the plan to be a desideratum addressed to the chemical industry, determining the quantitative and qualitative information of intermediates necessary for pharmaceutical production over a certain period of time.

As for the drugs, he was inclined to limit strict planning only to the production of the most "basic items, which, as experience had shown, would have a value over a few dozens of years"[12]. In regard to the general rules of the planning, he suggested continuing to represent the amount of production by its financial value rather than by weight[13].

Predicting unpredictability

The pharmaceutical industry, due to its specificity, created a problem for the communist planners. They knew that, even if entirely nationalised, it would not fit easily into the regime of the centrally-planned economy. Unlike, for example, the chemical industry, in which the communists very quickly introduced both annual and long-term planning for production levels of specific products, pharmaceuticals, being subject to a "changing level of demand", had been slipping out of their control from the beginning[14].

In general, it was understood that the pharmaceutical market differed from that of typical consumer goods. Experts working in the Co-

ordinating Committee agreed that predicting the character and scope of future diseases was impossible and thus precise long-term planning in the pharmaceutical industry was not an easy task to achieve. It was pointed out that even the interpretation of how different factors might influence future demands could vary. For example, in contrast to popular belief, the Co-ordinating Committee asserted that even a considerable improvement in living standards might not lead to the eradication of diseases, but rather a change of their character[15]. They assumed that the social revolution underway in the rural areas of postwar Poland would be the main factor stimulating the growth of demands for pharmaceuticals. Before the war, the majority of the peasantry had not been covered by any insurance plan and had limited access to medical services. As M. Konieczny, a representative of the Ministry of Health at the Co-ordinating Committee, phrased it, the national insurance plan envisaged by the new communist government would "enormously increase the consumption of drugs"[16].
Another stimulating factor was the rising number of medical staff in hospitals and clinics. During the Nazi occupation, Poland had lost nearly forty per cent of its doctors. It was believed the pre-war level of employment in health care could be re-established in the first half of the 1950s. Indeed, by 1955 Poland had six doctors per 10,000 citizens, which, compared to 3.7 in 1938, was a substantial increase[17]. Undoubtedly, more doctors would mean more prescription drugs.
In their long-term planning of drugs consumption the Co-ordinating Committee took into account nationwide campaigns intended to eradicate some diseases, and planned to intensify such activities after 1955. The only exception was the anti-VD campaign launched in 1948.
As reflected in the provisions of the economic plan the production of medicines was given top priority. The first six-year plan determined a seven-fold rise in drug production over 1950–1955. It also emphasised the creation of new branches of production, such as the synthesis of

hormones, vitamins and antibiotics. Penicillin production was to reach 800 billion units in 1955, the final year of the economic plan[18].
Overall, Poland achieved these goals. By 1954, the value of pharmaceutical production had increased eight-fold in comparison to 1938, but since the country's population had dropped from thirty-five to twenty-eight million during this period, the amount of drugs produced per capita was actually eleven times greater[19].
Expenditures in the pharmaceutical industry amounted to sixty-eight million zlotys in the first six-year plan, and 158 million in the second. Half of this sum was to be spent on expanding the capacity of antibiotic production in order to achieve complete self-sufficiency in this field by 1960[20].
The Ministry of Health also attached great importance to the professional training of medical staff. In fact, its financial efforts complemented those of the Ministry of Education, or even exceeded them in terms of value. In the academic year 1948–1949, particular emphasis was placed on the training of pharmacists: not to work in drugstores, but to swell the ranks of technical staff in pharmaceutical plants. The Ministry of Health doubted the advisability of spending more money on the construction of new factories if there were not enough personnel trained to work there[21].

The worst of all plagues

Looking closely at the minutes of the meetings of the Co-ordinating Committee for Drug Management Affairs, one would think the drug policy makers in postwar Poland were more concerned with ideological correctness than the availability and quality of drugs. The objective of improving provision of medications, although officially still stated, seemed to disappear from their priorities.
The new government tolerated private industry as long as it was convenient. As Adam Wang stated in the name of his party comrades, they "do not want the private industry to expand too much, because

it is not capable of creating a real industry"[22]. Another party activist, Janikowski, insisted on speeding up the process, suggesting that "the private initiative in drugs industry will have to be eliminated in one, two or three years. They are aware that they will be liquidated within five-six years, so there will be nothing particularly terrible if their existence was shortened"[23].

The ambiguity of the Co-ordinating Committee towards private drugs makers mainly concerned the quality of drugs. In October 1948, at a party gathering, Adam Wang thundered: "I have to say that private industry makes incomparably worse drugs. There were even incidences of death"[24]. The communists alleged the state-owned factories produced higher-quality drugs: independent controllers revealed a completely different picture.

In the second half of 1948, the National Institute of Hygiene (PZH) carried out a quality control of drugs produced in the country. In contrast to Wang's beliefs it showed that the "output of state owned factories [...] both in terms of quality and the variety [...] not only shows no improvement, but it gets even worse"[25].

Among the defective products discovered by controllers of the PZH it is worth mentioning a drug called Bismuthyl, which was extensively used in the newly launched anti-STD Operation W, where the W stood for weneryczny (Polish for venereal). It was being manufactured by one of the leading pre-war makers, Mgr. Klawe Company, which was taken into compulsory state management in 1945. The plant lacked adequate rubber plugs, and therefore the medicine was not sterile, resulting in immense pain when injected. In the conclusion of this report, the PZH clearly indicated a desired point of reference: "[A]t the same time the products from private companies are of high quality and they are properly packed"[26].

Where the attractiveness and quality of packaging offered was concerned the Ministry of Health officials concurred with the PZH. They considered the output from the state-owned enterprises to be

so miserable that "one must not pack any medicine like that, not even the shoe polish"[27]. On what the average consumer thought of the packaging, official documents remain silent.

Apart from being concerned about the quality and quantity of drugs supplied, the Co-ordinating Committee sought to organise the domestic pharmaceutical market in a way that would correspond with the new socialist ethics and ideology. In the late 1940s, in spite of the unleashed nationalisation of the means of production, there were still three forms of ownership existing in the business landscape. As well as the state-owned and private companies, there were co-operative enterprises. To avoid competition (!) between them the Committee established rules for their mutual coexistence[28]. In cases where only firms from one sector produced a particular drug, it was awarded a monopoly. When entities with different ownership made the same medicine, the Committee approved production limits for each of them on the basis of actual capacity.

In this model the distribution of drugs of all makes was entrusted to a trade agency entitled Centrosan.

Significantly, even before the scheme was put in operation, some members of the Co-ordinating Committee assumed there would be bad faith on the part of the private producers. As Mr Konieczny phrased it: "[They] would not obey the approved limits and because of their flexibility they would outperform the state-owned plants"[29].

The entrepreneurial private companies were also blamed for a brain drain. In early 1948, the director of Lobopharma, a state-owned factory based in Jelenia Góra, complained to the Human Resources Department of the Ministry of Industry and Trade: "[W]ell-developed private pharma has got large financial resources, it is very flexible and it attracts the best professionals by paying them a few times more than we do"[30].

Competition between the public and private sectors also existed in the procurement of raw materials and intermediates, especially those imported from abroad. The communist government monopolised

foreign trade and all orders payable in hard currency were managed centrally. Needless to say, state-owned establishments had easier access to these resources.

The ideological crusade against the old political and economical order in the country was so relentless that the regime even condemned examples of co-operation between private and nationalised companies, disregarding the benefits for patients such partnerships could produce. In October 1948, at a party conference on the pharmaceutical industry, Adam Wang accused the Federation of Pharmaceutical Industries (ZPF) of co-operating with the private sector: "[W]hile for the other branches of industry one can say the management is binding with the private initiative, in the pharmaceuticals these are not only managers [who co-operate], but there is a whole range of levels this disease bites deeply into"[31].

Given the weak position of ZPF, and thus its vulnerability to the "disease" of partnership with private business, party activists in the Ministry of Industry and Trade openly blamed the Central Board of Chemical Industry (CZPCh), who was 'treating ZPF like a modern day Cinderella', and for not being 'interested in helping it, either in planning or supplying'[32].

The battle for a penicillin factory

Tensions between the main actors on the national pharmaceutical market coincided with the turmoil that gripped probably the most important early-postwar undertaking – the building up of the antibiotic industry[33]. In January 1946, the United Nations Relief and Rehabilitation Administration launched a penicillin plant program which offered Poland, among other countries, a ready-to-assemble factory. However, the implementation of this plan was delayed by some two to three years.

From the very beginning the United States demonstrated a lack of enthusiasm for the program and torpedoed some of its agenda[34]. Later,

with the Iron Curtain descending, this lack of enthusiasm took the form of regular trade restrictions. When UNRRA ended its mission at the end of June 1947, the program was transferred to the Interim Commission of the World Health Organization (WHO) for continuation.

Since the donated factories had not yet been readied in any of the receiving countries, the WHO antibiotic commission led by Ernst B. Chain suggested upgrading the plants to meet actual efficiency standards in penicillin production. This would have involved the employment of counter-current separators made solely by a Chicago-based company, Podbielniak, Inc. The separators were used in the extraction process, but since the US administration feared they could be adopted to make biological weapons it banned exportation.

While the procurement and deliveries of factory equipment was delayed for political reasons, the Poles were having problems furnishing the building to house a production line. This was not caused by technical or financial difficulties, however, but resulted from the personal and political ambitions of the main actors involved. Since the early negotiations with the UNRRA it had been decided to erect the building in Kraków, the centre of Polish independent research into antibiotics. Local authorities were actively engaged in finding an existing building of sufficient size that would be easy to adapt to the new purpose.

However, the construction works were delayed. The party authorities in Warsaw suspected the Central Board of Chemical Industry (CZPCh) and the Federation of Pharmaceutical Industries (ZPF) were deliberately postponing the investment process. As they pointed out, Witold Gumułka, director of the latter, with a view to further employment in penicillin production, was striving to gather as many specialists in antibiotics as possible. With such a base his ZPF could have exerted control over the emerging industry[35].

In addition to the substantive objections to the functioning of ZPF, the hard-line communists questioned its political nature, therefore

casting doubt on Gumułka personally. They accused him of opportunism and criticised the fact he had joined the communist party only a day before being elected director of the ZPF. Besides this, it was no secret that he got the position thanks to the support of Aleksander Zmaczyński, the CZPCh director, who was also unpopular with the communists[36].

If the CZPCh and ZPF were playing for time, they had miscalculated terribly. At the end of 1947, the Ministry of Industry and Trade arbitrarily decided to transfer the investment from Kraków to Tarchomin near Warsaw. It is difficult to find any practical reason to justify such a move[37]. A few months later, the ZPF headquarters was also moved to Warsaw. This concluded the conflict between the technocrats from the industrial circles of Silesia and academically-oriented Kraków, and the hard-line party activists in the capital city of Warsaw, who wanted to assume tighter control over the pharmaceutical industry.

Drugs registration as a means of control

The drug registration process can be a powerful factor shaping the pharmaceutical market in any country and in any political setting. The Polish case was no exception. The communist government used this tool as yet another means of favouring state-owned companies over private ones. This was particularly the case before the National Medicines Institute (Instytut Leków) was formed in 1952, taking over responsibility for drug registration from the Department of Chemistry of the National Institute of Hygiene[38].

In early 1948, the Co-ordinating Committee launched a major reform of drug registration. By the end of April, all drug producers had to submit the medicines they were then selling and wait for a decision. If they did not hear back from the Committee within the five months following submission, they could produce the drug until a final refusal was issued[39]. In such a case the manufacturer would

have an additional month for a liquidation sale, after which all unsold stock was to be confiscated[40].

By mid-1948, the Committee had registered 442 drugs and forty-two organic compounds. Some of these medicines were registered by international companies that hoped to keep a share in the local market, such as Sandoz, Ciba and Roche[41].

As would be expected, priority in the registering process was given to the state-owned companies. It was initially believed this would give them an advantage over the private sector, but it caused serious chaos. As a representative of the Ministry of Health explained, the submissions from state-owned companies were much delayed and poorly prepared, and therefore clogged the registration pipeline. As a result 'a whole range of odd drugs' were still available on the market[42].

In such circumstances the Co-ordinating Committee decided to proceed with registering drugs made by the private sector. It began with "the most serious companies, which provided an opportunity of placing on the market fully valued drugs and guaranteed their quality"[43]. Among the 'most serious companies' which successfully registered their medicines, were Motor, Erhe, Karpinski, Winiewicz, Wolski, Gąsiecki and Asmider, all familiar to Polish patients from the pre-war era. As the Ministry of Health phrased it, their contribution constituted a "wide range and comprehensive supply to the domestic market"[44].

From among the state-controlled firms, Wander, Klawe, Pebeco, Labopharma, Boryszew and Spiess registered their products[45]. It is worth noting, however, that these were also familiar brands on the Polish market, sometimes for decades, having been supplied by private or joint stock companies before being taken under state compulsory management after 1945.

The main reason the registration process did not go smoothly was the lack of cohesion between the policies of different governmental bodies. As the Ministry of Health complained, shortly after the nationwide campaign for drugs registration was launched, the

Ministry of Industry and Trade started to change the names of compulsory managed companies. As a result, all registered medicines made by those firms had to go through the entire administrative procedure again[46].

Party officials did not even conceal their intent to use the drugs registration process to strengthen the state-owned companies against their private competitors. Adam Wang displayed a particular fervour when, during a discussion on advancements in constructing the drugs list, he gave explicit advice:

> *If, by accident, under two different drug names submitted by private and state companies, there was one medicine the committee shall approve the one produced by the latter one, and enter into an agreement with the private firm to let it make the drug under the brand name owned by the state firm*[47].

However, Wang had been corrected by a representative of the Ministry of Health, Mr Konieczny, who explained that it was chemical composition which was being examined, and the same preparation simply could not be registered twice, even if it had a different brand name. On the other hand, Konieczny drew attention to the problem of introducing new drugs, not yet produced in Poland. To reduce importation levels he advised that all measures should be taken to speed up the registration process; any domestic producer who could master production of such a drug should be authorised, whether private or state-owned. Konieczny complained, however, that in practice the process was often delayed by the Federation of Pharmaceutical Industries. The ZPF demanded the registration of new medicines from private companies be blocked if the Federation had plans to launch production in one of its factories in the foreseeable future[48].

Responding to Konieczny, Adam Wang stated that no one should hinder the initiative, and if a private factory made a valuable drug it should be registered. But, after a year or so, he added, if a state-

owned factory mastered the same technological process, the firms should negotiate a change in production limits.
While speaking about long-term planning, Wang pointed out this should involve a broader perspective on R&D, as well as on training. He also wanted to establish a roadmap of future investment, such as in the construction of new plants or the upgrading of old ones[49].

Curing the shortages

The scale of under-investment in the domestic pharmaceutical industry and the resulting large importations of drugs was a major concern for the government. Thus in 1948, it ambitiously envisaged achieving full self-sufficiency in drugs production within the next ten years. However, the feasibility and advisability of this plan met with scepticism, even within the Ministry of Health, where experts believed that some medicines had to be imported from countries where they were mass-produced and were therefore relatively cheap. They advised refraining from launching domestic production of too many kinds of medicines at all cost.
Despite this advice, the drift towards self-sufficiency prevailed until the mid-1960s. Most of the import quota was spent on raw materials and intermediates to feed domestic pharmaceutical production. Where readymade medicines were imported, these were mainly psychotropic drugs, not manufactured in Poland[50]. As Professor Piotr Kubikowski, director of the National Medicines Institute stated, launching the production of these drugs in the country would have required immense investment, and since a large variety and quantity of the medicines were available elsewhere, domestic production would not have been economically advisable.
Even at the Federation of Pharmaceutical Industries they had seen the benefits of importing medicines. Their representative, Mrs Bujak, at one of the Co-ordinating Committee meetings held in 1948, pointed out that "a complete cessation of drug importation would lead to

ossification of our knowledge", by cutting Polish medical and pharmaceutical circles off from global trends[51].

Foreign drugs were also finding their way to Poland through less official channels. In the 1950s, despite otherwise tight borders, drug trafficking was flourishing, along with all the negative consequences, including cases of poisoning among patients. In 1956, the Ministry of Health attempted to curb this phenomenon by designating a special pharmacy in every large city to buy up foreign medications, without asking how they had made it to Poland. Certainly, not every drug which the average Kowalski brought to such a pharmacy was collected. The Ministry prepared a list of over a hundred of the most desired medicines of foreign origin the pharmacies were buying up at market prices, and then selling them with a small profit margin[52].

In 1957, the Ministry of Health extended its wish list by another eighty-three items and also liberalised trading rules. One new regulation allowed hospitals to buy drugs from these pharmacies. At the same time, clinics were allowed to increase their drug stock inventory to three months. These two regulations combined to make hospitals important players on the secondary market of medicines[53]. However, such a move did not entirely eradicate the illegal trade of pharmaceuticals in the country. On the contrary, increased demand for foreign medicines even encouraged trafficking from abroad.

The seriousness and persistence of illegal trading can be witnessed through the reminiscences of contemporary chemists. Mr Piotrowski, who ran the pharmacy commissioning foreign drugs in Warsaw, complained about "the competition of numerous speculators, who arranged their deals in front of the pharmacy's windows and sold drugs often appearing to be outdated and worthless"[54].

Drugstores collecting foreign medicines had become a permanent fixture in the Polish pharmaceutical landscape. In 1959, there were thirty-two such enterprises, with an annual turnover of 136.6 mil-

lion zlotys, accounting for three per cent of the annual drug sales in Poland[55]. It is apparent, therefore, that what was originally meant to be an ad hoc alleviation of the most acute deficiencies had become a kind of veiled admission of the private importation of drugs.

Quite early on, an expectation began to grow that the secondary market of foreign drugs would provide patients with what the centrally-planned pharmaceutical companies could not. This resulted in some newspapers blaming the management of those thirty-two pharmacies for the poor access Poles had to foreign medications.

Society at large, however, noted the oddity of such accusations. One of the readers of the *Dziennik Polski* newspaper ridiculed such claims and indicated the real reason of inadequate availability of modern drugs in Poland, which was – obviously – a very limited import[56]. In his letter to the editorial board he wrote: "If we can import French cosmetics, I think we should bring medications first"[57].

Demands that the importation of drugs be increased, rather than other goods, were widespread. It was considered embarrassing that patients' families from different parts of the country were sometimes forced to seek a specific remedy by announcing their needs through the public radio[58]. The drama of these appeals completed and at the same time perpetuated the image of a poorly supplied pharmaceutical market[59].

However, the voices demanding increased importation might have had a hidden agenda. Polish patients were prejudiced against domestic medicines and, in spite of official propaganda, usually complained about their quality. The relevant ministries, manufacturers' federations and individual companies tirelessly promoted national products. The main argument they relied on was that Polish drugs were exported to the West. Since they were sold to more sophisticated clients, it was claimed, they could not be so bad.

Perhaps the most significant feature that discouraged Polish customers from buying otherwise effective pharmaceuticals was the poor

quality of packaging. Advertisements for Polish medicines were unattractive, and thus any impact on sales was likely to be negative. One may argue that another important reason advertising was so inefficient was that it was mainly addressed at medical staff, ignoring the potential of patients for shaping the market. It is more likely that drug policy makers and manufacturers underestimated the role of such subjective elements as snobbery, which might have led to a real or imagined belief in the superiority of foreign drugs.

The issue of poor marketing by state-owned companies had been recognised since the early postwar era, when the Co-ordinating Committee for Drug Management Affairs unsuccessfully tried to instil a passion for aesthetics in the management of the newly nationalised pharmaceutical companies. In the late 1940s, they could have learned from the example of private firms doing far better in the art of successful advertising. Later, the foreign drugs reaching Poland through more or less legal channels clearly indicated the gap between the unappealing mediocre domestic supply and what was offered to consumers in market economies.

Since calls to improve the aesthetics of packaging were so widespread, it appears surprising that state-owned pharmaceutical companies had not generally heeded this advice for decades: a rather strange explanation had been developed to justify the backwardness of Polish industry in this regard. According to Krystyna Libman, writing for *Dziennik Polski* in 1960, the domestic industry was so focused on introducing new types of drugs and on improving their quality that it consciously left aside the question of packaging aesthetics[60].

The national press, however, did not restrain from asking tough questions of the Ministry of Health and other authorities responsible for drug supply, and openly criticised those customers who succumbed to the fashion or – to cite the newspaper literally – psychosis regarding foreign drugs[61]. A good example of how such trends emerged (and afterwards expired) was the Polish career of the tranquiliser Miltown. This was one

of the first anti-anxiety medicines to be introduced in America in 1955, and soon began to pour into Poland through private channels.

At first it was only available on the black market. But once admitted to the pharmacies commissioning foreign drugs its popularity began to fade. Milton lost its aura of rarity, as a medicine available only to the chosen ones. By the time two factories run by the Federation of Pharmaceutical Industries in Stargard and Łowicz launched production, the drug "had become an ordinary remedy, although still difficult to obtain"[62].

Another alleged wonder-drug at that time was a simple glutamic acid. According to the Ministry of Health's estimates, future demand for that medication would be thirty tons a year. Due to the unexpected and quite unexplainable fame the drug achieved, however, actual demand reached 600 tons[63].

Yet another psychosis revealed itself as a market-shaping factor in the early 1980s, and, at the same time, as a phenomenon with potentially a highly dangerous nature. The collapsing economy and uncertainty about the future impelled many people to make unreasonable purchases and stockpile any products still available, including medications. The domestic market lacked even basic commodities, although the situation was not as dire in pharmacies as it was in the literally empty groceries. However, the martial law introduced on 13 December 1981, escalated the atmosphere of unpredictability. The stockpiling of drugs inevitably aggravated shortages and in many cases led to poisoning through the consumption of medicines which had been stored for too long and consequently expired[64].

The government attempted to deal with the situation, but was apparently not as concerned with safety issues as it was with preventing the shortages from getting worse. It was decided that redundant drugs could be bought back from individuals who had purchased them unnecessarily. Pharmacies were ordered to accept all non-expired drugs which were unpacked. Needless to say, pharmacists

were opposed to the new regulation. Aside from their everyday duties, they now had to inspect the integrity of packing and the expiration date, and re-label boxes and flasks before putting them back on sale[65].

The state of permanent shortages stimulated initiatives of more or less bizarre natures, such as one implemented in 1987. To overcome the shortfalls in supplies of disposable needles it was proposed that their plastic holders be replaced with aluminium ones, as this "would allow the one-time needles to be sterilised three to four times"[66]. However, the shortages led to serious pathologies, such as the Włocławek tragedy, which provoked a huge country-wide response. A doctor at a city hospital, wanting to conserve hard-to-get albumin, decided to inject a newborn with medicine from a previously broached vial, resulting in the death of the child[67].

Overuse from a lack of drugs

When predicting the rise of drug demand, analysts at the Polish Ministry of Health usually referred to consumption patterns from Western societies, with the reservation that the amount per capita would remain four to six times lower[68]. These proportions proved persistent, particularly in the case of antibiotics, consumption of which rose from 0.6 grams per person in the mid-1950s, to four grams in the early 1980s.

In view of the almost permanent drug deficiency on the market it seems unlikely that overuse of medicine could have been an issue in communist Poland. Moreover, bringing consumption levels up to Western standards was still considered by some to be an indicator of gaining the higher civilizational status.

Nonetheless, in the 1970s and 1980s, voices calling for a curb on drug abuse became more audible. Exhortations to reduce consumption for medical reasons were rare, however, and calls for a more equal distribution of scarce resources prevailed.

The attitude of Polish doctors and patients towards drug use and abuse was probably similar to that found in Western societies. Some doctors gave in to patients' demand for stronger and more effective agents, which might have led to drug abuse in individual cases. On the other hand, Polish physicians were in line with their patients openly demanding a better supply of medicines. More likely that they would have prescribed more drugs had they been available.

The fundamental difference between the pharmaceutical market in Poland and elsewhere was the attitude of the industry towards drug consumption. In the free market model it is big pharma that seeks to maximise its profits from sales of medications. In a centrally-planned economy, as the case of communist Poland demonstrates, the pharmaceutical industry itself took measures to reduce the consumption level. In the mid-1970s, Polish newspapers reported that the industry had diverged from the principle of informing people about the composition of medicine, as well as about the contraindications and recommendations on the brochures attached to packaging. It was "hoped, that such a move would reduce the number of those, who dared to take on their own treatment"[69]. Although this may sound strange, the industry attempted to reduce demand for their products to a level it could meet.

At the other end of the distribution chain, pharmacies also attempted to reduce consumption by limiting the sale of medication to one box per person. As a result, many patients were forced to return to clinics to ask for another prescription, if that was their doctor's recommendation. This, in turn, caused more work for medical staff, and consequently made the plan extremely unpopular among doctors[70].

Another idea was to match the size of packaging to a typical dose of the drug needed in a particular treatment. However, opponents of such a solution argued that its implementation would have needed extensive consultation with the medical world to develop average consumption standards. In addition, since resistance to drugs chang-

es over time, the effectiveness of approved dosage would have to be constantly overseen and adjusted accordingly[71].

In 1981 – the year martial law was introduced – the drugs supply to the domestic market suffered its worst decline. Unlike workers from other sections of national industry, those from the state-owned pharmaceutical plants did not take part in the massive protests and riots. They were also excluded from the scheduled power shutdowns, which happened regularly during this period due to the poor performance of the national energy network. However, they were often forced to stop production as a result of their co-operators going on strike. Another factor affecting production was a lack of packing materials. Limited access to foreign currency halted deliveries of these from Western countries[72].

The resulting drug shortages could not have been eased by different ownership, as these were virtually nonexistent. Not only had the private producers been nationalised long before, the co-operative sector had also been severely truncated[73]. In 1981, there were just five pharmaceutical co-operatives working in Poland, down from more than thirty only a few years earlier.

The co-operatives mainly produced simple drugs to fill supply gaps on a market dominated by the state-owned behemoths, but more importantly they provided these companies with a whole range of intermediates[74]. The collapse of the co-operative manufacturers not only worsened the shortages of medicines directly, but also disturbed the functioning of the pharmaceutical industry in general, by breaking the supply chain of semi-finished products and raw materials. This coincided with a short-sighted policy by the Ministry of Chemical Industry, which from 1977 to 1980 had ceased the production of thirty-one intermediates still needed by drug makers. As a result, up to twenty-nine of these had to be imported in order to keep production going[75].

The collapse of the pharmaceutical industry contributed to the general crisis in the national health care system in Poland during the

1980s. In 1982, therefore, the government launched an operational program with an initial task of listing those medicines deemed essential, the availability of which the government wanted to guarantee[76]. The list consisted of nearly 1200 drugs, mainly life and health saving medicines.

The implementation of this plan, however, was highly inadequate. The pharmaceutical manufacturers had made some efforts to increase production levels of the most necessary medicines, but the real bottleneck was in their distribution. In mid-1982, the national monopolist in the pharmaceutical trade, Cefarm company, admitted it had not been given the list to determine whether it was implemented in practice or not[77].

In subsequent years the situation deteriorated further. While in the first quarter of 1986, out of 2314 drugs registered in the country there was a shortage in as many as 640, this number rose to 1085 in the second quarter[78].

Facing a dramatic drug shortage the industry re-launched the production of drugs which had previously been abandoned as outdated. This was particularly the case for penicillin and its derivatives. Poland was forced to do so in view of the delay in completion of a modern antibiotic factory in Tarchomin[79].

Low-efficiency becomes chronic

The planned expansion of the existing antibiotic plant in Tarchomin serves as an example of the seemingly absurd policies of the communist regime regarding the pharmaceutical industry. Rather than about providing Poles with much needed modern antibiotic drugs, the new production line was a part of a larger scheme to strengthen Poland's export potential[80]. In 1973, the government decided to buy a license from the US company, Squibb, for the production of penicillin G, cephradine, epicilline and the 6AP acid[81]. The deal was finalised two years later, and the construction of the plant commis-

sioned to McKee, also a US company. Poland took out a loan of five million dollars to buy the license and an additional million for the strains of *Penicillium*. The loan was to be repaid to Squibb – in the form of antibiotics – by 1981.

The new works had to be built in Tarchomin, as an extension of the local plant, and in accordance with its specialisation in antibiotics within the Polfa federation. At the same time, drawing on its own technology, the factory management wanted to modernise the existing production lines of carbenicillin, ampicillin and erythromycin. The latter was of particular importance since Poland had specialised in its production under the Council for Mutual Economic Assistance (CMEA) agreement since 1962, and practically monopolised its supplies to Eastern European markets[82].

The investment process of the new Tarchomin plant was long and painful. At first, the Ministry of Chemical Industry failed to include the envisaged antibiotic plant in the framework of the national investment plans for 1976–77. As a result, in 1976 it had to abandon the R&D on the implementation of the purchased license. Eventually, work on the construction site started in the second half of 1978. By early 1981, when the new plant was already supposed to be repaying the American loan, construction was about two years behind. Although spending had already exceeded the planned budget at the time, even fundamental structures such as the fermentation hall were not ready.

The Tarchomin investment was analysed by the Supreme Audit Office (Najwyższa Izba Kontroli). The controllers discovered that construction was behind schedule because the general contractor was not able to locate and employ enough workers. Moreover, even as prestigious an investment as a modern antibiotic plant suffered from the shortages of basic building materials, such as gravel and cement. Meanwhile, in September 1981, the license obligations of the Squibb Company had expired, as had the warranty on technical equipment such as the

centrifuges, separators and regeneration column, which had not even been tested since being delivered from the US.
With such a delay in the investment process it was necessary to extend the license agreement for the next three years at the cost of few more million dollars. To avoid penalty fees, the Poles had to buy the million-dollar worth strains, despite the fact the plant laboratory, in which they could have been safely stored, had not been completed.
One might think that delayed construction of the main plant might at least have benefited its future co-operators, who were given extra time to expand the production capacity of raw materials and intermediates, enabling the domestic base to be fully deployed once the Tarchomin plant began production. Nothing could be more misleading: when production of penicillin G started, practically all the intermediate products had to be imported from the West[83].
The expansion of the plant in Tarchomin, though by no means the only case, was probably the most peculiar example of how the organisational paresis of the centrally-controlled economy took effect. It shows how the vaguely defined boundaries between the competences of various institutions, and sometimes the simple carelessness of individual decision makers, could disturb even the most prestigious investments. An attempt to acquire a modern technology, rather than producing a leap in progress and generating huge profits, had ended with substantial financial losses and international disgrace.
Another example – of much smaller calibre, but also perfectly illustrating the anatomy of pathologies plaguing the Polish pharmaceutical industry – was the case of as simple a product as a liquid for hand disinfection. Poland bought a license and launched production of this cleansing agent in the mid-1980s. In Western countries, where the liquid was in common use, the bottles had automatic dispensers, which when pressed, dosed some five millilitres. The Polish manufacturer supplied the hospitals with the liquid bottled in large balloons sealed with stoppers. As physician

and Parliament Member, Mieczysław Szostek, depicted it: "[A] surgeon was standing with his arms stretched over the basin, while the nurse tilted the bottle to pour the liquid out"[84]. As a result, in Szostek's estimate, consumption of the liquid increased to three to five times above normal usage.

In general, the pharmaceutical industry was criticised for low profitability, a point made at the Parliamentary hearings in July 1986, when the healthcare situation was discussed. Even more controversial was the nationwide listing of top-performing companies, which had been previously published. Four out of the ten best firms belonged to the federation. The explanation of this paradox, however, is very simple. The winning companies had been making relatively modern drugs intended mainly for export, while most of the state-owned factories were producing very basic medication for the domestic market, balanced on the edge of profitability[85]. As a whole, Polfa was not doing very well.

The allegations of low efficiency and mismanagement made against the state-owned enterprises associated in Polfa, were sometimes accompanied by contrasting examples of pharmacies doing well, in spite of the prevailing economic crisis. During the worst shortages of the early 1980s, many pharmacies undertook production of simple medications on their own. These were mainly the composite powders, suppositories, syrups, and infusion fluids. Basically, the druggists had returned to their traditional activity[86].

Low-technology exports

The initial, somewhat dashing plans to achieve complete self-sufficiency in drug supplies quickly proved unrealistic. Despite how it might appear to the average patient, importation continued to cover a significant part of domestic demand, but at the same time, Poland kept expanding its export capacity.

The communist power had quickly realised that selling drugs abroad could be a valuable source of hard currency. Indeed, during the 1960s

and 1970s, the pharmaceutical industry was a proverbial goose laying golden eggs. With merely 8.3 per cent in total production output of the chemical industry in 1967, its share in export value was three times as high. The Ministry of Chemical Industry planned to increase the exportation of drugs even further over the following years[87]. To reach this goal, the production capacity of some medicines was developed far beyond domestic needs[88].

But the export policy makers underestimated the scope and pace of ongoing changes in the global economy, particularly growing competition and increasing expectations of product quality. The Polish pharmaceutical industry was too sluggish to successfully compete in the more demanding markets.

It was not overly innovative, either, as can be seen from patenting statistics. For example, in 1963–67, the Polish Patent Office received a mere 388 submissions of new pharmaceutical products, out of which 248 patents were granted[89]. Overall output should not be regarded as an impressive achievement by local scientists, especially since most of these patents were granted to foreign pharmaceutical companies.

This trend was typical for the entire chemical branch from the 1960s onward, which observed the escalating expansion of foreign companies over that period. In 1965–67, the number of patents granted to national entities increased symbolically by just one per cent, while foreign interests noted a rise as high as forty-eight per cent. The number of their applications increased even more, reaching 275 per cent! At the same time, Polish inventors submitted 26.5 per cent more solutions[90].

Even more disturbing than the numbers for the Polish authorities, was the character of foreign patenting activity. While local entities mainly patented minor improvements in existing technologies or chemical processes, the patents granted to foreign firms covered complex processes or large groups of chemical compounds[91]. These practices were regarded as patent trolling, aimed at preventing local researchers from securing their own solutions. The government saw

this as a threat to the development of domestic industry and to the country's position as an exporter, but being bound by international patent law it could not impose a protectionist policy in this or any other sector.

The organisation of research

Reasons for the poor innovativeness in pharmaceuticals in postwar Poland cannot be definitively determined. One factor which must be taken into account was an unsuccessful attempt to centralise R&D in one institution, the Pharmaceutical Research Institute (IF) established in 1952. Its research staff was initially recruited from the prewar Warsaw-based Chemical Research Institute (Chemiczny Instytut Badawczy – ChIB)[92].

The main task of the new Institute was to conduct research on new pharmaceuticals, particularly synthetic ones, and introduce them into production in the state-owned industry. Overtime, however, this effort to centralise research activities proved to have failed, and individual factories began once more to furnish their own laboratories. As a result, limited resources, both human and financial, had been scattered all the more.

Compared to the IF, which was centrally managed and had a bureaucratic overhead, the factory laboratories were considered far more effective in solving technological problems arising in everyday practice. Such a laboratory created an opportunity for each company to improve production and adapt to the changing conditions far more easily than would have been the case in co-operation with another institution[93].

Trans-institutional collaboration must have been a real shortcoming in contemporary conditions, as the industry even restrained from entering into closer relations with the hospitals and medical universities; something quite evident elsewhere in the world. This was yet another drawback of the Polish medical reality of the postwar period[94].

During its early years, the IF developed over forty new drugs, which were implemented by the domestic industry. During 1952–65, the total profit from these forty innovations amounted to some 1.5 billion zlotys[95]. However, the Institute's output should be regarded as rather modest, when compared to that of the R&D departments of the top four Polfa plants in Tarchomin, Kraków, Jelenia Góra and Pabianice. For example, during 1966–69, the IF implemented eleven projects, while those four laboratories realised as many as 1161[96]. Despite this relatively poor performance, the IF maintained its position as an independent body.

In general, however, the authorities were aware that the several hundred researchers working in the central research institutes and factory laboratories were unlikely to compete with the R&D divisions of an average foreign pharmaceutical corporation, which employed a research team perhaps comparable in number, but far better equipped and paid.

Besides, there was yet another factor which inevitably diminished the effectiveness of the R&D departments both in the central and factory laboratories. The problem was in the peculiar way Polish scientists carried out research work. In 1969, the vice-president of the Polfa plant in Kraków, complained that most of his research staff had 'a tendency to work individually, which was giving them an opportunity to demonstrate their personal scientific achievements'[97]. The awareness that only effective teamwork could help Polish researchers catch up with the foreign competitors, or at least not lose more ground to the global leaders, was present but not prevailing.

Conclusions

The drug policy carried out in Poland by the communist governments between 1945 and 1989 was incoherent and inconsistent. Ideological considerations played too much of a role in its construction during

the early postwar era. Revolutionary fervour overshadowed the most important goal – the benefit of the patient.

Nationalisation of the private pharmaceutical companies was accomplished with exceptional ruthlessness, even for a communist regime. Private industry was replaced by centralised structures, which proved unable to effectively adapt to the specific conditions of the drug market, such as unpredictability and inconstancy of demand. Once the agile and flexible competitors had vanished, the complacency of the state-owned companies increased and they fell into stagnation.

Of course, the starting position of the Polish drug industry, which had been created literally from scratch with limited access to modern know-how and financial resources, was not an easy one. The fact that it was poorly managed by directors appointed on an ideological rather than a competitive basis did the rest.

During the first postwar years, Polish industry in general operated in somewhat autarkic conditions. To some extent this policy was enforced by a lack of hard currency and the general political settings of an already divided Europe. One may argue that, in the short term, the autarkic approach had a positive effect, allowing as it did the entrenchment of the domestic industry. In the long run, however, the Iron Curtain which separated the pharmaceutical branch in Poland from foreign competition also cut it off from the latest technology and preserved its archaic structure.

Initially, in the 1950s and 1960s, the Poles had sought self-sufficiency without taking into account economic and technological limitations. The industry undertook the production of too many different kinds of medication, many of which could have been imported at far lower cost. In the 1970s, large resources were allocated to developing the production capacity of export-oriented drugs. As a result, companies working mainly for the domestic market experienced underinvestment, resulting in a total breakdown of drug supplies in the early 1980s.

Equally unsuccessful was an attempt to centralise R&D. The creation of a central research body, intended to gather the best scientists in one place, only increased the fragmentation of scarce resources. The ineffectuality of that move can be judged from the fact that the majority of domestic technological progress was actually achieved in the factory laboratories.

Reasons for the weaknesses of Poland's pharma should also be sought in the pricing policy. It was driven from the top down. The prices of essential drugs were kept low for years in spite of the growing costs of labour and raw materials. While in the centrally-planned economy drug producers were supposed to assist the financial plan, many factories focused on making only the most expensive drugs and neglected the most basic needs of patients.

These negative tendencies emerged even more intensively during the economic crisis of the early 1980s. After the fall of the communism in 1989, when political barriers were lifted and Poland restored free market principles in the national economy, the domestic pharmaceutical industry proved unable to survive in the modern world. Nearly all factories grouped in the federation Polfa went bankrupt[98]. They were privatised and sold to international corporations, who consequently closed many of them down and replaced their output with products from their mother factories in Western Europe or Northern America. Poland, the largest exporter of pharmaceutical products in the Eastern Bloc in the 1970s, had lost all of its foreign markets, and returned to its previous position as a prodigious importer of drugs.

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Wydawnicza, 1980; *Zakłady Farmaceutyczno-Aerozolowe 'Unia' 1938–1988*. Warszawa, 1989; BURDA P., *Warszawskie Zakłady Farmaceutyczne Polfa. 175 lat tradycji i historii, 1824–1999*. Warszawa, Polfa, 1999; *190 lat Polfa Tarchomin S.A*. Tarchomin, Polfa, 2013.

2. KURKOWSKA-BONDARECKA K., *Historia polskiego przemysłu farmaceutycznego* in series *Karty z historii polskiego przemysłu chemicznego, t. 3*. Warszawa, Stowarzyszenie Inżynierów i Techników Przemysłu Chemicznego, 1995. The most prolific author writing on the history of the Polish pharmacy and pharmaceutical industry was KIKTA T., who authored, among others, *Przemysł farmaceutyczny w Polsce 1823–1939*. Warszawa, Państ. Zakł. Wydaw. Lek., 1972.
3. RUTKOWSKA E., *Polityka władz państwowych w Polsce wobec aptek i aptekarstwa w latach 1944–1951*. Warszawa, DIG, 2009.
4. Different works give numbers varying from twenty-five to thirty-five per cent.
5. Minutes of the sixth meeting of Coordinating Committee for Drug Management Affairs, 24 June 1948, file 74. 295/XI/214, fond Central Committee of Polish United Workers' Party, The Central Archives of Modern Records in Warsaw (zespół Komitetu Centralnego Polskiej Zjednoczonej Partii Robotniczej, Archiwum Akt Nowych w Warszawie) henceforward AAN.
6. During military operations the pharmacies were usually plundered by soldiers of the Soviet Army. After the frontline moved further to the West, and before the new Polish government took full control over the liberated territories, pharmacies were robbed by looters who, in turn, introduced those drugs to the black market. See DRYGAS A., *Zaopatrzenie ludności w leki i sprzęt medyczny (sanitarny) w Polsce w pierwszym okresie po zakończeniu drugiej Wojny Światowej*. Archiwum Historii i Filozofii Medycyny 1995; 58(2): 173.
7. KURKOWSKA-BONDARECKA K., *see* note 2, p. 77.
8. A report on the status and organisation of the Federation of Pharmaceutical Industry (Sprawozdanie o stanie i organizacji Zjednoczenia Przemyslu Farmaceutycznego), file 4, 295/XI/214, AAN.
9. In 2007 it was renamed the National Institute of Public Health (Narodowy Instytut Zdrowia Publicznego – NIZP). There is ambiguity in the translation of Zjednoczenie both in the primary sources and in secondary works. Association, Union or Federation are being used. The latter has been adopted in this article.
10. Polish Workers' Party (Polska Partia Robotnicza – PPR) was the predecessor of the Polish United Workers' Party (Polska Zjednoczona Partia Robotnicza – PZPR), which ruled Poland until the democratic change and collapse of communism in 1989.

11. Minutes of the, *see* note 5, file 72.
12. *Ibid*., file 73.
13. This method of determining the volume of production prevailed over the next forty years. The only exception was made in the case of export results, where the volume was shown in tons.
14. Minutes of the, *see* note 5, file 73.
15. Minutes of the, *see* note 5, file 78. One discussant gave an example from France, where the general improvement in living conditions brought the plague of tuberculosis to an end, but was also blamed for an escalation in the incidences of kidney and liver diseases.
16. Minutes of the, *see* note 5, file 75.
17. HIRSZFELD L. et al., *Dziesięciolecie medycyny w Polsce Ludowej, 1944–1954*. Warszawa, Państwowy Zakład Wydawnictw Lekarskich, 1956, p. 15.
18. *Ustawa z dnia 21 lipca 1950 r. o 6-letnim planie rozwoju gospodarczego i budowy podstaw socjalizmu na lata 1950-1955*. Dz.U. 1950 nr 37 poz. 344, p. 435.
19. HIRSZFELD L., see note 17, p. 13.
20. *W 1960 r. produkcja antybiotyków pokryje zapotrzebowanie kraju*. Głos Koszaliński, 15 October 1957: 4.
21. Minutes of the, *see* note 5, file 76.
22. *Ibid*., file 90.
23. Minutes from the meeting held on 23 October 1948, file 129. 295/XI/214, AAN.
24. *Ibid*., file 117.
25. A note on shortages in drug supplies, file 143. 295/XI/214, AAN.
26. *Ibid*., file 144.
27. Minutes of the, *see* note 5, file 92.
28. *Ibid*., file 81.
29. *Ibid*., file 82.
30. Państwowa Fabryka Chemiczno-Farmaceutyczna Labopharma to Departament Kadr Ministerstwa Przemysłu i Handlu, Jelenia Góra, 28 February 1948, file 51. 295/XI/216, AAN.
31. Minutes from the, *see* note 23, file 117. 295/XI/214, AAN.
32. *Ibid*., file 118.
33. ŁOTYSZ S., *Historia ekstraktorów Władysława Podbielniaka*. Kwartalnik Historii Nauki i Techniki 2011; 56(2): 117-142.
34. For more on the restrictions and their consequences, see ŁOTYSZ S., A "lasting memorial" to UNRRA? Implementation of the penicillin plant program

in Poland, 1946-49. ICON: Journal of the International Committee for the History of Technology 2014; 20 (2); in print.

35. Minutes of the, see note 5, file 78.
36. Zmaczyński was an outstanding expert in physical chemistry, it being a discipline of his habilitation dissertation, defended before the war. He also worked at the Chemical Research Institute during the occupation. In 1945 he was a member of the operating groups that were taking over and re-launching the chemical factories in Silesia. He served as the deputy director of the Steelworks 'Pokój' and director of the Federation of Coal Industry. From 28 April 1945, he was appointed a director of the Central Board of Chemical Industry. He was not an avid communist, and joined the Polish Workers' Party as late as March 1946. See *Zmaczyński Aleksander* in *Słownik Biograficzny Techników Polskich*. Warszawa, Wydawnictwo FSNT, 1992, pp. 203-204.
37. In Polish historiography the prevailing opinion is that the main reason to move the investment to Tarchomin was an existing technical infrastructure and particularly the preserved boiler room of the former Ludwik Spiess & Son factory. See KIKTA T., *Zapomniane karty z przeszłości Tarchomina*. Warszawa, 'Polfa,' 1965, p. 57.
38. PARNOWSKA W., *Charakterystyka naukowego dorobku Instytutu Leków (1951–2001)*. Analecta: Studia i Materiały z Dziejów Nauki 2002; 11(1-2): 156-158. The Department of Chemistry of PZH was separated from the National Institute of Pharmacy (Państwowy Instytut Farmaceutyczny – PIF) in 1930. In 1945, the unit was renamed the Department of Chemical and Pharmaceutical and attached to the National Institute of Hygiene (PZH), and had been serving its control and registering duties since then. In 1951, the authorities made the decision to establish the National Medicines Institute due to the enormous work congestion in the Department. PZH was a continuation of a pre-war institution of the same name, founded by Ludwik Rajchman in November 1918. See BALIŃSKA M., *The National Institute of Hygiene and Public Health in Poland 1918–1939*. Social History of Medicine 1996; 9(3): 427-445.
39. The waiting time for a decision was pretty long, and the delays were on a daily basis, since there was only one man handling all the submissions at the Department of Chemistry.
40. Minutes of the, *see* note 5, file 92.
41. *Ibid.,* file 89.
42. *Ibid.,* file 88.
43. *Ibid.,* file 88.
44. *Ibid.,* file 89.

45. *Ibid*., file 89.
46. *Ibid*., file 89.
47. *Ibid*., file 90.
48. *Ibid*., file 90.
49. *Ibid*., file 74.
50. *Warszawa zostawia w aptekach 660 milionów zł rocznie*. Stolica 1965; 14 February: 4.
51. *See* note 5, file 75-76.
52. *Wkrótce zostanie uruchomiony punkt skupu leków zagranicznych*. Dziennik Polski 1956; 15 March: 6.
53. *Nowe lekarstwa zagraniczne ukazały się w sprzedaży*. Dziennik Polski 1957; 18 September: 2.
54. *Ibid*.
55. LIBMAN K., *Zaufanie i reklama*. Dziennik Polski 1960; 9 July: 4.
56. *Mniej kosmetyków, więcej lekarstw*. Dziennik Polski 1956; 31 May: 4.
57. *Ibid*.
58. *5 węzłowych zadań*. Dziennik Polski 1957; 26 March: 3.
59. The use of public radio to locate medications ceased before 1965. See *Warszawa zostawia*, *op. cit*. (note 50).
60. LIBMAN, *see* note 55.
61. *Ibid*.
62. *Ibid*.
63. *Ibid*.
64. LIPIŃSKA M., *Jaka recepta na leki*. Stolica 1982; 6 June: 2.
65. *Ibid*.
66. The information dated 1 February 1987, comes from the Polish Press Agency (Polska Agencja Prasowa – PAP) and is cited after an underground brochure 'SI SKN' number 42, 1987. See BIKONT A., BIKONT P., CESARSKI W., *Małe vademecum Peerelu z wycinków gazet podziemnych w formie kalendarza robotniczego na rok 1990*. Warszawa, Agora s-ka z o.o., 1990, p. 111.
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70. LIPIŃSKA M., *see* note 64.
71. *Ibid*.
72. *Ibid*.

73. The strikes had a political character and targeted the state as the principal employer in the country. In general the workers in co-operatives and in typically very small private enterprises did not strike.
74. *Jak na lekarstwo*. Przegląd Techniczny 1981; 5: 6.
75. Przegląd Techniczny 1981; 9: 7.
76. *Dostawy leków*. Przegląd Techniczny 1982; 2: 27. In spite of the prevailing economic crisis, the annual budget for supplying drugs to the market and hospitals was raised by three billion to 23.7 billion zlotys.
77. LIPIŃSKA M., *see* note 64.
78. SEIDLER B., *see* note 67.
79. OLEKSIEWICZ J., *Praski krytyczny próg*. Stolica 1977; 11 December: 5.
80. Talking about the export potential may sound strange in view of the chronic supply to the domestic market, but in the 1970s, Poland was a significant regional exporter of drugs, as is explained in the next paragraph. The Tarchomin plant sold the antibiotics worth seven million dollars behind the Iron Curtain alone. See Informator Robotniczy 1975: 287.
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82. DOMAGALSKI W., *Antybiotyki*. Horyzonty Techniki 1974; 7: 14.
83. KARWICKA K., SIŁUSZEK A., *see* note 81.
84. SEIDLER B., *see* note 67.
85. *Chroniczna choroba*. Przegląd Techniczny 1987; 43: 12.
86. *Samowystarczalność totalna*. Przegląd Techniczny 1981; 42: 2.
87. *Leki i patenty*. Dziennik Polski, 18 December 1969: 3.
88. LIBMAN K., *see* note 55.
89. 248 patents out of 388 submissions is an efficiency rate of sixty-four per cent. It was almost twice as high as the national average in other fields, which suggests that the submissions were based on solid research work. See: *Leki i patenty*, *see* note 87.
90. *Leki i patenty*, *see* note 87).
91. *Ibid*.
92. SZELEJEWSKI W., PASZKOWSKA-REYMER T., (eds) *60 lat Instytutu Farmaceutycznego, 1952–2012*. Warszawa, Studio BAK, 2012, p. 10. In June 1946, after reconstruction of the Chemical Research Institute in Warsaw, eight research departments were established. There were two which dealt with pharmaceuticals: Laboratory of Pharmaceutical Industry and the Laboratory of Synthetic Medicines.

93. KIKTA T., *Informacja o rozwoju produkcji antybiotyków w Polsce*. Warszawa, Tarchomińskie Zakłady Farmaceutyczne 'Polfa', 1975, p. 2.
94. Leki i patenty, *see* note 87.
95. SZELEJEWSKI W., PASZKOWSKA-REYMER T., *see* note 92, pp. 14-15.
96. KIKTA T., see note 93, p. 3.
97. Leki i patenty, *see* note 87.
98. One of the reasons that the Polish pharmaceutical industry could not compete on the global market was the new regulations introduced by reformed patent law in 1993. Throughout the communist period in Poland one could not patent a medical compound but only the method of making it. Therefore, a peculiar situation occurred in which a sort of piracy of foreign know-how was sanctioned by the communist state. This flourished as the companies of the Polfa federation were reproducing many expensive foreign drugs by developing new methods of making them. They were sold to the domestic market and exported to the countries of the Eastern Bloc. After 1993, the rule of patenting the compound was introduced to bring national regulations into line with international patent law, ending these dealings, see SZUBA T., *Ekonomika leku. Podręcznik dla studentów farmacji i farmaceutów, część II*. Aptekarz 2003; 11(10): 285.

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