

**The Historical
Prologue to
Modern Drugs
Development
in the 19th and the 20th
century**

J. AM. L. S. OF F. 2014/2015

Drug therapy as it exists today must be seen largely as an ultimate consequence of the developments in pharmacy's sciences and practice, that took place in the nineteenth century.

At the beginning of that century, most medicines in use were remedies of vegetable origin, whose chemical structure was unknown. As the century advanced, important progress was made in pharmaceutical sciences, though only very few new drugs were introduced into therapeutics.

An example:

The literature quotes a list of the „best things“ in the first British pharmacopoeia (1864) for the pharmacist and physician of the day: they comprised digitalis, opium, atropine, morphine, quinine, ether, chloroform, ferrous sulphate, iodine, sodium bicarbonate, and the sources of some of the vitamins, none of which had yet been described.

Compounding Pharmacy

has a long and respected history.

Up until the twentieth century, all medicines dispensed were compounds.

Pharmacists, would extract active ingredients out of natural products such as the foxglove or poppies.

They would then combine the extracts with other powders and liquids to create elixirs or tinctures.

Eventually, drug manufacturers began to manufacture drugs, on a much wider scale than pharmacists could do **within their pharmacies**.

As commercially available medications became more widespread, pharmacists became dispensers of medications.

By the end of the 1960's almost all prescriptions dispensed by pharmacists were commercially manufactured.

From next overview

which lists the dates of the discovery and first therapeutic use of some drugs,

one can see how,

in the course of nearly 200 years,

the development of novel agents has

progressively accelerated to reach the situation with which we are familiar today.

Some landmarks in the development of modern drugs

Year

Landmark

- 1803 Serturmer reports isolation of **morphine**,
- 1846 Morton demonstrates the effects of **ether in anaesthesia**,
- 1847 Sir James Young Simpson reports the first use of **chloroform in anaesthesia**,
- 1867 Lister introduces **antiseptic surgery**,
- 1875 Buss uses **sodium salicylate** as an antipyretic and for rheumatic fever for the first time.

- 1877 Laqueur reports the therapeutic use of **physostigmine** in the treatment of glaucoma; its chemical structure, however, is only elucidated in 1923,
- 1882 Koch reports the discovery of the **tubercle bacillus**,
- 1883 First use of **paracetamol** by von Mering,
- 1899 Dreser introduces **acetylsalicylic acid**,
- 1903 Introduction of **barbital**,
- 1911 Ehrlich introduces the arsenical compound 606 (**Salvarsan**) for the treatment of syphilis.

- 1912 Introduction of phenobarbital,
- 1922 Banting and Best discover insulin and use it for the first time,
- 1935 Domagk reports the use of prontosil red (sulfamidochrysoidine),
- 1936 Fournieu and colleagues report on the effect of sulfanilamide in curing experimental infections,
- 1938 Merritt and Putnam discover the anticonvulsant properties of phenytoin and report its use for the symptomatic treatment of epilepsy,

- 1939 Eisleb and Schaumann introduce the use of pethidine,
- 1940 Chain and Florey report the isolation of penicillin,
- 1943 Thousands of 4-aminoquinoline derivatives are synthesized and tested for activity, in connection with an extensive cooperative programme of antimalarial research in the United States during the Second World War; chloroquine is released for field trial; when hostilities cease, it is discovered that the drug had been studied under the name of Resochin, by German workers in 1934,

- 1944 Schatz, Bugie and Waksman announce the discovery of **streptomycin**;
from 1947 to 1952 streptomycin is the only effective antituberculosis drug available,
- 1948 Introduction of **chlortetracycline**, the first **tetracycline**, soon followed by oxytetracycline (1950) and tetracycline (1952),
- 1948 Introduction of **chloramphenicol**,
- 1951 Introduction of **isoniazid** for the treatment of tuberculosis,
- 1951 Introduction of **procainamide** as an antiarrhythmic,

- 1952 McGuire and colleagues discover erythromycin,
- 1952 Laborit demonstrates the effects of chlorpromazine and Delay and Deniker are the first to use it in psychiatric patients,
- 1954 Demonstration of the clinical effects of sulfonylureas in diabetes,
First report on the antifungal properties of nystatin,
First report on the use of meprobamate as a sedative,
- 1955 Extensive field studies with hormonal oral contraception in San Juan de Puerto Rico,

- 1957 Iproniazid is introduced for the treatment of depression,
Sternbach's group at the Roche Laboratoires develops chlordiazepoxide,
- 1958 Kuhn recognizes the antidepressant effect of imipramine,
- 1959 Janssen discovers the antipsychotic properties of haloperidol,
- 1960 Durel and colleagues introduce metronidazole as a trichomonacidal,
- 1972 Sir James W. Black reports the discovery and development of betablocking agents,

- 1972 Sir James W. Black reports the discovery and development of antihistamine H² drugs,
- 1982 The first genetically produced drug (human insulin),
- 1989 Gastric ulcers are treated by using medicines instead of operations,
- 1994 New drugs are able to take away the breakout of Alzheimer's disease,
- 1996 The drugs combinations are able to take away the breakout of AIDS,
- 2004 First preparations against colon cancer.

2000s Era of Nanotechnology

Introduction of **NANOPHARMACEUTICALS.**

NanoPharmaceuticals are the pharmaceuticals designed using "nanotechnology".

It is a science of creation and utilization of materials, devices, and systems through the control of matter on the nanometer-length scale.

We speak about the era of Drug Delivery Systems.

As seen, during the 1930s and
even the 1940s,
pharmaceutical products accounted for a
very low proportion
(often less than 25 %)
of all remedies sold in pharmacies,
whereas today they account for over
80-90%.

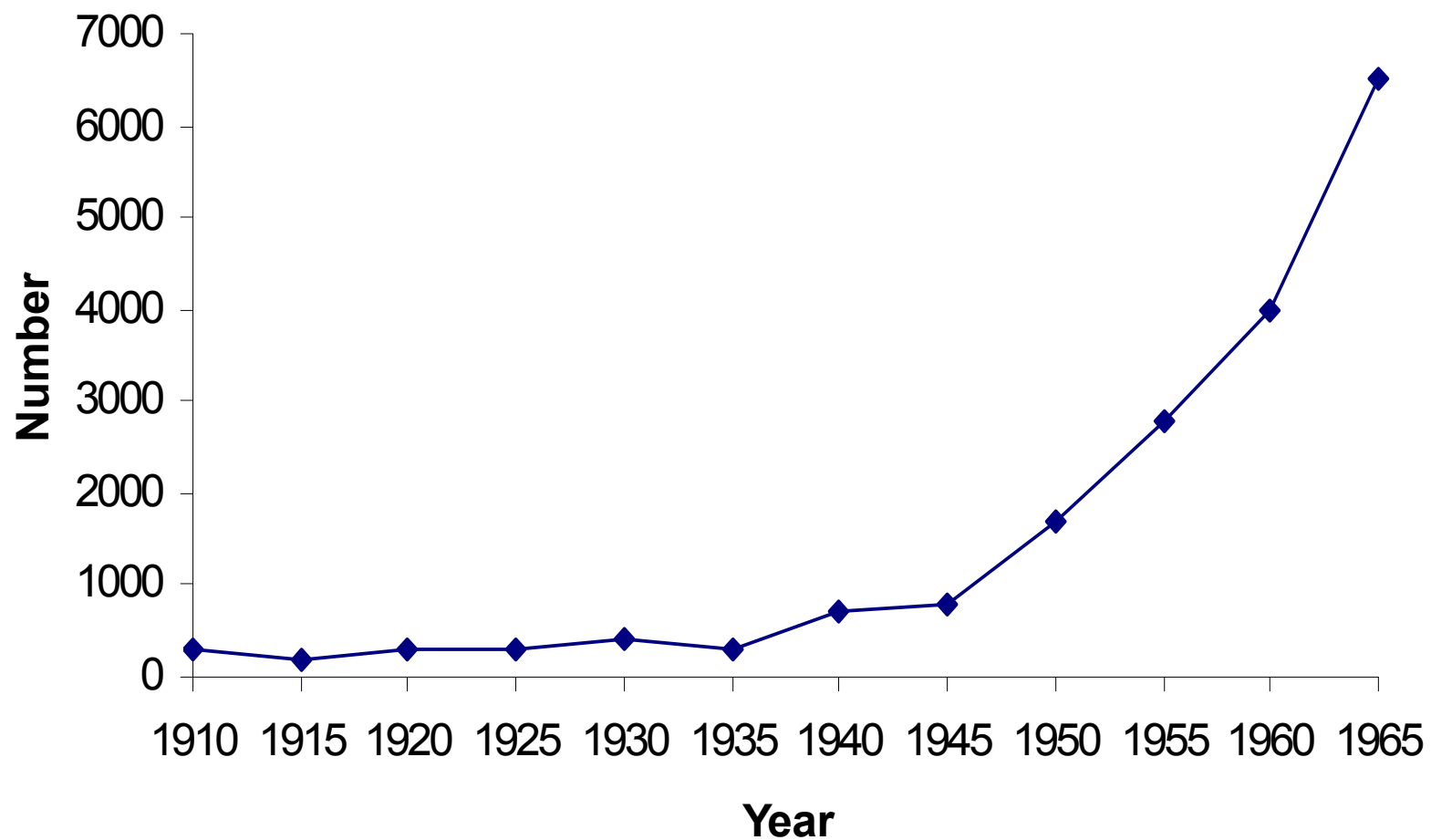
Within a decade of the end of the
Second World War,

the „drug explosion“
was well under way.

Fig. 1
clearly illustrates

that explosion has reflected in the rapid
increase,
in the number of pharmaceutical patents
issued.

**Fig.1: Rise in the number of
chemicopharmaceutical patents**



Finally, and in parallel with these other developments,

the scientific approach began to evolve in pharmacy and medicine, and was destined to develop to the point where the scientific assessment of drug would be both feasible and generally accepted.

The rapid introduction of
thousands of different products
for therapeutic use

coincided with an increasing
demand for health
services.

The latter was the result of developments

- in economy,
- in living standards,
- in the creation of social security systems,
- in national health services,
- and in schemes for reimbursement of the costs of drugs.

The expansion of the
therapeutical arsenal,
however, also very clearly reflected
the pressures exerted by drug
manufacturers,
ever seeking to ensure a constant
expansion of the market.

The increase in drug consumption

has been far from uniform
around the world.

The increase
in the use of pharmaceuticals,

backed by aggressive promotion in a manner
unknown for any other form of health care,
has had an obvious

cultural impact:

- it has increased dependence on allopathy,
- and therefore on doctors and pharmacists as social groups,
- and it has tended to supplant other traditions of care and healing.

Thanks for your
attention.