

# THE THIRTY-YEAR HISTORY OF VOLVO



Written by

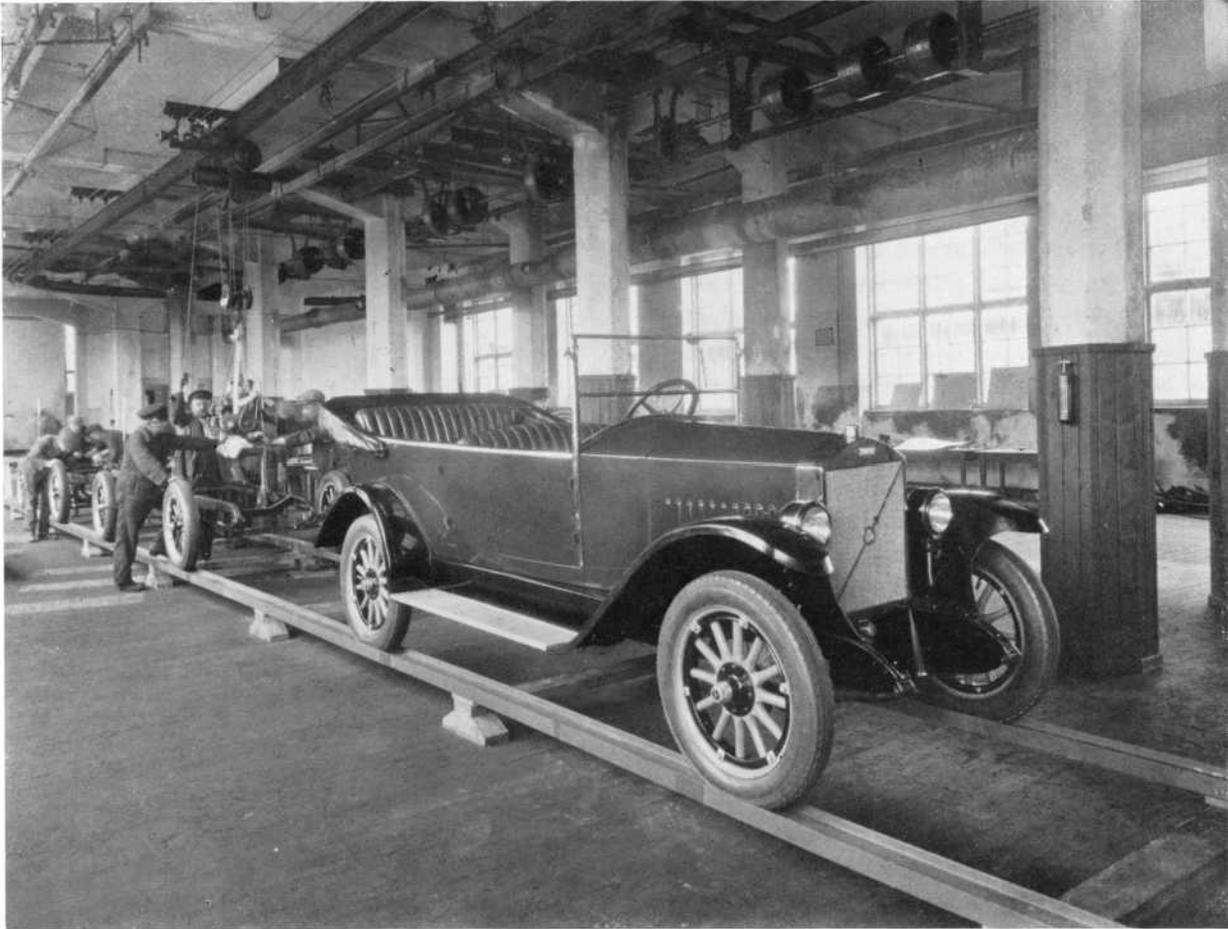
ASSAR GABRIELSSON

founder of the Volvo

Company and its president

**until 1956**

*Assar Gabrielsson, the founder of the Volvo Group which is one of the largest in Sweden's engineering industries, states the following interesting and occasionally rather unconventional viewpoints concerning automobile manufacture in general and Swedish automobile manufacturing in particular.*



*Jacob-the very first Volvo-on the assembly line in 1927. This car had a 28 b.h.p. four-cylinder side-valve engine.*

## THE THIRTY-YEAR HISTORY OF VOLVO

It was not only a desire for adventure that led to the founding of Volvo. All the essential requirements for a profitable Swedish automobile manufacturing industry existed to a reasonable extent:

- Sweden was a well-developed industrial country.
- Swedish rates of pay were low.
- Swedish steel had a world-wide reputation.
- There was a demand for automobiles built for Swedish roads.

At that time, Swedish industry had advanced pretty far in many fields. Names such as SKF, ASEA, Bofors, Husqvarna and many others were wellknown both in Sweden and abroad. A complicated thing like an automobile requires many different manufacturing processes which, in their turn, must have a complete series of machines especially built for the purpose. These machines were

available in Sweden to a large extent. Swedish engineering skill was of a highly developed character. The Swedish worker had centuries of tradition behind him. Sweden had earned the reputation for manufacturing high-quality products.

In 1901, C. E. Johansson in Eskilstuna had invented combination gauge blocks and thus laid the foundation for the Swedish engineering industry which was essential for the series production of automobiles with fully replaceable component parts. Ford, who realized the value of Johansson, persuaded him to come to the United States in 1923 but the quarter-century spent by Johansson in Eskilstuna had a permanent significance. He had taught Swedes the art of precision measuring and had given them the tools with which to carry out the job.

The second condition, low rates of pay, was equally

significant. At that time in the United States, the workers were being paid about the same in dollars as Swedish workmen were getting in kronor. And the Americans were to be our first competitors since their products dominated the Swedish automobile market.

Swedish iron ore, Swedish pig-iron and Swedish steel had a large turn-over on world markets and were sold in large quantities even in countries with their own iron ore resources and steel production. All over the world people knew that Swedish steel was better than the steel from other countries. Experts discussed the "body" of Swedish steel—a word used to describe the superiority shown by experience but impossible to explain.

Swedish steel was good but Swedish roads were bad, particularly when compared to American roads. Most of the cars sold in Sweden were built for straight concrete roads. They had soft springing and were built for highspeed driving. Neither of these qualities were particularly suited for the twisting, pot-holed, dirt roads of Sweden. What needed was an automobile with harder suspension—an automobile that would hold the road. All Swedish people remember the "washboard" roads. Only a really rugged automobile would escape being shaken to bits on such roads.

There were certainly enough essential requirements for a Swedish automobile industry. But there were problems to be solved too.

The most important of these was to build a Swedish automobile so economically that it would be able to compete with American automobiles. Mass production was, naturally, the solution. But since the market would be limited to Sweden, at least during the first few years, the rate of mass production possible could hardly be on the same scale as in the United States. The question was whether the low Swedish rates of pay could com-



*The PV 4—the first Volvo sedan with a leatherette-covered wooden body.*



*The first buses were not exactly beautiful—but they ran well.*

pensate for the labour-saving automation and the lower tool costs per manufactured part which was possible in the larger series produced in the United States. We who founded Volvo thought that they would.

After we personally had accepted the economical risks and had built a test series of ten automobiles more or less by hand, we managed to raise enough capital for a preliminary series of 1,000 automobiles. Our program was fairly ambitious: 1,000 automobiles the first year, 4,000 the second year and 8,000 the third year. Our plans did not go any further than this since we were convinced that having manufactured 8,000 automobiles, we would be running with a profit.

In reality, however, things did not quite work out the way we had planned. We got manufacture started but sales during the first year—that was 1927—did not exceed 300 automobiles, the second year 900, the third year 1,400 and so on.

One problem which caused us a good deal of worry from the beginning was how to spread our sales out evenly during each year. After all we were building automobiles and in Sweden these are mostly sold during the spring and summer months. In order to maintain the same production level all the year round, we had to find some way to dispose of the surplus automobiles during the fall and winter. We decided to favour the Argentine and other countries south of the Equator with this surplus and of the thousand built during the first year we had reckoned on exporting 400. In point of fact not one was exported during the first two years and export was not essential either since we could not produce as many automobiles as we had planned and there was no difficulty in disposing of them in Sweden. We managed to even out seasonal variations during truck production which was begun during the second year. We found that truck sales were fairly even all the year round

with a slight tendency to increase at the end of the year.

When I said that we managed to raise enough capital for the first series of one thousand units, this did not mean that we were able to equip factories to produce these automobiles either completely or partially. Even the American factories bought certain units for their cars from firms which specialised in certain branches. Volvo took things even further and ordered all parts, all material and all units from various industries in Sweden. Design and assembly work was done by us. We used the expression "Building the Volvo way" to cover this type of working.

The advantage of this system, apart from the fact that it did not require so much capital investment, was that we could exploit the long manufacturing experience of the firms from which we had ordered the component parts. In a publicity campaign we ran during the first years, we underlined how old-established and experienced these various industries were. Bofors had been established in 1646, Svenska Stalpressningsaktiebolaget (Swedish Pressed Steel Company), Olofstrom in 1735, Husqvarna Vapenfabrik in 1689 etc. This, we found, great success. There was, undoubtedly, a great deal of truth in our statement that the inherited skill and traditional quality of the foremen and workers in these industries was incorporated in Volvo automobiles.

Without in any way detracting from the sales problems during the first years, it is true to say that manufacturing problems were the greatest. These were divided into two groups:

1. How to reduce the costs of the component parts manufactured by our sub-contractors so that our automobiles were really competitive.
2. How to plan, in Sweden, the production of special automobile units for which we had none of the specialised machines required and no experience and which in many cases demanded large-scale production to make the work pay.

Work on the second of these problems soon came to our help as far as solving the first problems was concerned. We were forced to a certain extent to obtain certain specific technical automobile units from abroad-I am thinking of electrical equipment, various instruments, carburetors etc. In this way we made contacts abroad which gradually developed and gave us possibilities to set up foreign competition against our Swedish sub-contractors.

We were also fighting against competition of all sorts ourselves. This competition became the Damocles sword we had hanging over the heads of our sub-contractors. If we could not find other

Swedish firms to compete in the manufacture of various component parts, we could always find foreign firms. The result of this was that Swedish sub-contractors often accepted the price we offered. Otherwise, if he did not accept it, the order went abroad. Due to the fact that we were aware to the possibilities of purchasing abroad, we had a certain advantage over our own foreign competitors. The large industrial countries in which our competitors work can be regarded as sealed units. A British car manufacturer would never think of buying a carburetor in Germany or France even if it was better. The American automobile industry limit itself exclusively to the United States in the same way as German and French manufacturers restrict their manufacturing activities to within their own frontiers. But when we at Volvo bought abroad we did not favour any particular country. We bought where we found the best product. Our purchasing field became larger and more varied since we did not need to have any consideration for nationalist feelings.

In 1928 when we produced our first sedan type automobile, neither the body factory at Olofstrom nor any other firm in Sweden could series produce complete metal bodies and we were forced to produce the automobile with a wooden body covered with leatherette-a system that was very popular in France. Gradually we managed to get bodies which were metal from the waistline downwards, the upper section consisting of wood with leatherette covering. The next phase as a metal body on which only the roof itself was covered with leatherette and in 1936 we had advanced to the point where we introduced all-welded steel bodies.

A significant phase in our development was when we persuaded our Swedish sub-contractors to send technicians to foreign countries, primarily



*This truck from 1928 had a payload of 800 kg. (1,760 lb.)*



*The first streamlined car-the PV 51 Carioca-made its appearance in 1936.*

the United States, where they could learn the most modern manufacturing technique and use it in Sweden.

We had started as an assembly plant which was, however, not of the same type which was then in operation in the United States mainly engaged on the assembly of standard parts. Ours was an assembly plant with full control of design. It became quickly obvious to us, however, that if our production was to increase from year to year and if we were to follow ultra-modern manufacturing methods, it was essential that we ourselves started to make some of the parts.

The first item in the program was the engine, or rather engines, since we had begun to use several different types of engine. In 1931 we took over the majority of the shares in Aktiebolaget Penta-Verken in Skovde. This is where Volvo engines had been made from the very start. In 1934 Penta-Verken was completely incorporated in Aktiebolaget Volvo.

Our capital had gradually increased to 4 million Swedish kronor. It now increased again in one step up to 13 million kronor. Earlier the firm had belonged to SKF. It was now independent.

During the years up to the outbreak of World War II, development work and modernisation of the Penta factory and our own assembly plant was

carried out parallel with work of the same type carried out by our sub-contractors.

The struggle to reduce production costs of the part made by our sub-contractors took many forms. In many cases, the risks involved were carefully weighed up against the advantages. I shall mention an example. In 1933 we were ready with the design of an overhead valve engine for use in heavier trucks. The crankshaft in this engine was world news in automotive construction as it had integral counterweights, i.e. the complete crankshaft was forged in one unit while the motor industry, even in the United States, had used separate counterweights which were attached to the cranks. We contacted several American crankshaft manufacturers and our own crankshaft sub-contractor, Bofors. The Americans were not able to undertake manufacture of a crankshaft that was so complicated. The price stated by Bofors was very high if it was to be based on the quantity of one thousand engines needed for the following year. We were forced to take the risk and order 10,000 crankshafts with delivery over a certain period of time on the assumption that this engine would be manufactured for some year and even if the engine design was to be modernised in any other respects, the crankshaft must remain unchanged. At this point I should like to add that this engine remained

practically unchanged with exactly the same crankshaft for such a long time that it was in production for some years after World War II.

We started in a period of trade depression and found ourselves in the rather strange situation that while other industries and tradesman waited impatiently for a period of prosperity, we were worried about the period of prosperity. Among those who lacked faith when we started Volvo, there were many who thought that it would be quite possible to buy cheaply from Swedish sub-contractors as long as there was a trade depression and the various industries had little to do but when prosperity returned, they would no longer have any interest in Volvo and the small margin of profit derived from work for Volvo.

Things did not work out that way at all. When prosperity gradually returned, the demand for our products increased. We could plan larger production series which meant lower production costs for the manufacturers and thus prevent any price increase in excess of the average increase for all the components.

Many people who showed friendly interest in Volvo during the first few years seemed to have the idea that the various large sub-contractors should be share-holders in the company. In other words, Volvo would be a collective concern of various Swedish industrial interests who saw in Volvo an addition to, and an equalising factor in, their own production. I am glad now that I did not accept that suggestion. It would have eliminated competition, the possibility for various manufacturers in the same branch to compete with each other - and foreign competitors - for the most favourable tender and it would have made Volvo the pawn in a game of interests which did not always concern Volvo. My action in this case was a practical application of the principle of national economy which I learned during my Commercial College days from Prof. Heckscher. This principle was that co-operative consumption could be a very good thing but co-operative production was completely hopeless.

Even if purchasing and manufacturing problems were most complex during the first ten years, the



*Assembling the Volvo PV 544. The car is ready to drive away one and a half hours from the time that the body from the spraying plant has been lifted onto the assembly line. The main line is supplied with complete sub-assemblies such as front and rear suspension units, balanced wheels, doors and the complete bonnet with front fenders, radiator, grill and headlights from separate feeder lines.*



*The Volvo Sport a plastic body which is now out of production.*

sales side was not completely free from difficulties. It took a great deal of very hard work to create a sales organization for the excellent, robust but rather rural-looking automobiles-the first sedan we built described as likening a pregnant cow.

People in the automobile branch were certainly interested but this interest was purely out of politeness. They would not risk investing money in getting this Swedish automobiles sold. There were others who knew less about cars but were prepared to risk more. The owner of a general store in Varmland specialising in bilberries, a soldier from Vastergotland, a coal merchant from Skane and a bank manager in Smaland were among those who had courage enough to take part in this great adventures. Naturally, we had real automobile dealers as well in Gothenburg and Stockholm among other places. We had thought of export right from the start. As early as the beginning of 1928 we had decided to try and build up sales in Finland mainly because there were many Swedes in Finland and that Sweden and Finland had been associated by historic bonds. We did not manage to find anybody willing to assume responsibility for our sales there so we were obliged to start our

own sales organization. We still have this daughter company there-the only one on the sales side-since it has always run extremely well. As early as 1939, we had advanced so far in Finland that we sold a large percentage of trucks and about 50 % of all the buses used.

As the years went by and our vehicles got a good reputation, it became easier to get hold of dealers in Sweden. Gradually the large and influential dealers switched to Volvo but it is also a pleasure to note that many who had started without knowing much about automobiles at all are still with us.

We had started out activities with the manufacture of automobiles and, during the second year, had commenced truck manufacture to supplement sales. In point of fact it turned out that trucks (and buses in later years) became the largest and most profitable vehicles. There were several explanations for this:

Due to the extremely high cost of tooling up for the manufacture of automobile bodies and the relatively limited productive capacity at that time at the Olofstrom body builders, we could not afford to have more than one model for several years in

order to amortize the tools at a reasonable rate. Our competitors produced new models every year. Sometimes the newness was limited to the appearance of the automobile but even that was irritating enough. Opinions concerning the points that are esthetically attractive vary as much concerning automobiles as they do concerning women's hats and clothes on the whole. Even though we were in constant contact, particularly in the United States, with the tendencies and probable developments in the future concerning automobile design and styling, we could only follow model variations within very limited ranges. This placed us at a disadvantage as far as the greater part of the automobile-buying public was concerned.

As far as trucks and buses were concerned there were other viewpoints to be considered. A long reliable lifetime and fuel economy were the important factors here. The quality factor was the decisive factor to a greater degree than where automobiles were concerned. In our sales, trucks and buses dominated almost one hundred per cent. We had managed to build up a considerable export market, first in the other Scandinavian countries and later in Holland, Belgium, certain of the Mediterranean countries and the larger markets in South America. The devaluation of the Swedish krona in 1932 helped us considerably.

In 1939 we had developed so much that our manufacturing program consisted of 9,000 units of which 5,000 were trucks and buses and 4,000 automobiles. At that time about 35 % of the trucks and buses we manufactured were exported but only a negligible number of automobiles. It was still mainly the possibility of manufacturing in Sweden that limited our turn-over since during the pre-war years we only had sporadic difficulties concerning the sale of certain models. About 15 % of the material used in our vehicles was foreign, this figure varying slightly from model to model.

Our capital had increased to 18.2 million kronor.

Then came World War II and the whole situation changed immediately. Sales ceased almost completely and those who had been keenest for early delivery began to cancel their orders. As a matter of fact when the war started we had already managed to manufacture and sell so much that 1939 was a record year but total sales figures were 7,500 units instead of the 9,000 we had reckoned on.

While we were still worried as to how to keep our factory busy, our engine plant had begun to work, together with Svenska Flygmotoraktiebolaget (The Swedish Aero-Engine Company) in Trollhattan to a certain extent, as sub-contractor manufacturing certain components. This co-operation developed and during the war when Volvo had

enough capital available, the share majority in Flygmotoraktiebolaget was purchased, partially to avoid the depreciation in the value of money caused by continual price increases and partially to incorporate this extremely high-precision Swedish industry in the Volvo concern.

In the same way our co-operation with Kopings Mekaniska Verkstad (Koping Engineering Works), our transmission manufacturer, developed and, in connection with an increase in capital, we bought this company, too, in 1943.

The shortage of rubber had caused us grave concern even during the first years of the war so we decided to start the manufacture of agricultural tractors which could, to a certain extent, be run with iron wheels instead of rubber tires. A great deal of work was carried out in conjunction with Bolinder-Munktell. Increase in production due to deliveries to the Swedish army and the manufacture of special vehicles meant that the tractor work developed relatively slowly and the actual manufacture of tractors was not commenced until after the end of the war.

When the war started we were one single company with an assembly plant and an engine factory. By the time the war ended, we had become a concern with greatly developed production and increased capacity, we had experience from the solving of vastly differing problems which we should never have encountered earlier, a consolidated position and a share capital of 37.5 million kronor.

But what was even more important was that our designing departments had been able to devote their attention to planning a post-war program which was to be a decisive factor in the future of Volvo. We had the advantage as far as competition was concerned. The countries engaged in the war had been so occupied with their war efforts that they had not had the opportunity to devote any attention to their peacetime production. Volvo, on the other hand, had had the opportunity to prepare.

Two main lines had been followed, the design of a small automobile and the construction and testing of a Diesel engine.

During the last two years before the war we had seen how small automobiles, particularly the German Opel and DKW, had begun to dominate the Swedish market and it seemed obvious with the gradual improvement of the state of the Swedish roads, small automobiles were to be more of a success on Swedish roads than I had earlier thought possible.

I shall never forget the success of our small automobile, the PV 444, both in the big exhibition we arranged in Stockholm in September 1944 and



*The PV 544 is in great demand in the United States.*

later as people in general and experts in particular had an opportunity to see this automobile and even more important-to drive it.

I cannot deny that luck played a certain part in the design and construction of this automobile but it is not altogether surprising that this youthful team of engineers should have luck on their side when they worked as they did.

Several new constructional principles were incorporated in the design of this car: short-stroke engine, integral construction body, independent suspension, self-adjusting brakes, "direct steering" -decreased ratio in the steering box, advanced streamline design and so on.

Both our own opinion and the opinions of others made us exceptionally optimistic but we never believed that by the time 1956 arrived we should have built a total of 125,000 of this model alone which had certainly been modified and modernised in many ways but was still basically the same as in 1944. The demand for this car today is such that we hope to manufacture at least another 125,000. We never dreamed that we should present this model in the United States in 1956 where, unless all the signs are completely wrong, it is a success,

The Diesel engine was just as significant. We had two alternative constructions, one of the pre-combustion chamber type which runs more quietly and the other with direct-injection which has better fuel economy. We chose the former for buses but

continued our experiments to obtain quieter operation with the direct-injection type. The idea was to produce an engine combining quiet operation with fuel economy.

For those who are not so familiar with such things perhaps I should mention that a Diesel engine is run on fuel oil instead of gasoline and since in most countries the tax on fuel oil is lower than that on gasoline, making fuel oil cheaper to buy, the Diesel engine, though more expensive to buy, has been used more and more after the war.

Our Diesel experiments led to the three types of Diesel engine on our manufacturing program today. All three are of the direct-injection type, thus differing fundamentally from the German Diesel engines. It is difficult for me, when discussing our Diesel engines, to assume the virtue of modesty which is so becoming. Volvo Diesel engines have virtually pursued a course of victorious progress round the world or at least the parts of the world where we operate and today all Volvo buses are fitted with Diesel engines and 70 % of our trucks. Only the lighter trucks we manufacture are still fitted with gasoline engines.

The situation after the war was characterised by shortages everywhere of material and goods and an exceptionally great demand in the countries that had been directly engaged in the war, a demand inspired by the necessity of building up what the war had ruined and filling the gaps caused by

the fact that war efforts had utilized power at the expense of the normal levels of the actual resources of the countries in question.

These shortages had two consequences for Volvo during the years immediately after the war:

On one side there was a shortage of vehicles partly in Sweden but particularly in the war-ravaged countries and, with the difficulties associated with a return to peacetime production and actual manufacturing difficulties experienced in the large industrial countries, this demand could by no means be satisfied during the years immediately after the war.

On the other hand we had considerable difficulties in obtaining material for our production and due to such a reason as shortage of sheet steel, we could not commence production of the small automobile until 1947 and then only on a limited scale. The available supply of material in various connections limited for some years the development which lay within our reach and which led us to set a primary target of 20,000 units per year after the war. We approached this figure first in 1950 when we sold 18,833 units including 8,715 automobiles.

Shortages in various countries caused limited export possibilities and the subsequent currency deficiencies reduced their possibility to import. For several years the export department at Volvo was struggling with license and currency problems more than with purely sales problems. From 1946 to 1950, currency difficulties were least marked in the Argentine and Brazil and these countries began to dominate our export market to a greater extent than earlier.

Currency difficulties in various countries forced them into bilateral trade agreements. It was not possible to buy more in a country than what it was possible to pay for by means of goods exported to that country. The formation of the European Payment Union went a long way towards multilateral trade agreements. Parallel with this was the demand for "free-listing" in connection with American assistance measures in Europe and elsewhere. Today truck and bus markets at least are free in most of the countries to which we export and the automobile market is free in many of them.

EPU solved the currency problem between the European countries. The dollar problem remains for most countries. This has naturally to a great extent eliminated American competition on the automobile markets in many countries and where this competition exists, it is much less troublesome than it was during the pre-war years depending on the high dollar rate of exchange.

Earlier, foreign markets had always been the

field in which we could try out our competitive qualities since we operated under the same conditions from a customs point of view as our competitors. The conditions which, during a number of the post-war years, eliminated the competitive factor, made it difficult to judge exactly how competitive we really were. Some markets were able to gradually introduce free trade without the necessity of excluding dollar goods. Among these was Belgium, a country in which we have carefully followed our sales figures and our position relative to our competitors more than on other foreign markets. It has been great pleasure for me to note how our sales figures in Belgium during the last five years—since free competition was re-introduced—have shown a steady climb. This has concerned our Diesel trucks in particular, in which field we have surpassed our competitors without exception. Progress as far as automobiles is concerned has also been good.

In Sweden, a period of well-being has been reflected in an increase in car sales to an extent that nobody had dared to dream about. When Volvo started in 1927, there was one car for every 55 inhabitants in Sweden. At the end of 1954 there was one car for every 11 inhabitants and the tendency continues. Today Sweden lies in third place in the world after the United States and Canada as far as the number of cars relative to the population is concerned. In England there is one car for every 15 inhabitants, in Denmark one for every 22, in Norway one for every 31 to mention a few examples.

The almost explosive development of primarily the automobile market in Sweden followed by an increased demand for buses and trucks both in Sweden and abroad resulting from our advances in the Diesel field meant that we were forced to expand our productive capacity. Even before we had attained our first post-war production target of 20,000 units per year, we had already set ourselves higher targets which we gradually attained. In 1955 we delivered a total of 46,261 units and in 1956 the total passed the 50,000 mark. Our share capital has grown to 90 million kronor.

During my life as a businessman, I have been active in many different fields: eggs, ball bearings, matches and automobiles, to mention the most important. The automobile business has been the most difficult (with the possible exception of the egg business—but I was young then and inexperienced).

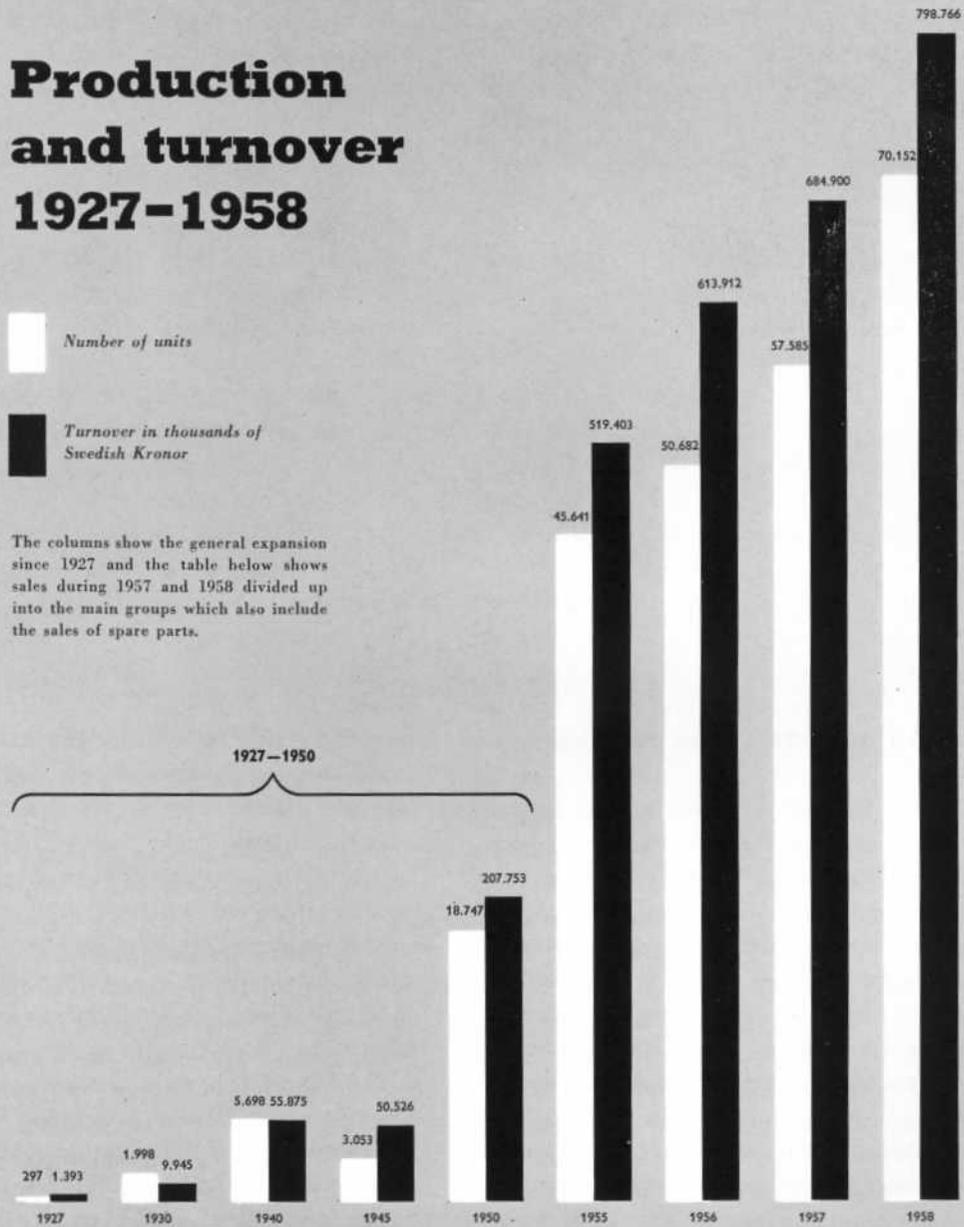
Work with automobiles demands, to a greater extent than most other branches, a continual modernisation, the maintenance of a never-ending progress in this field, a process of continually keep-

# Production and turnover 1927-1958

Number of units

Turnover in thousands of Swedish Kronor

The columns show the general expansion since 1927 and the table below shows sales during 1957 and 1958 divided up into the main groups which also include the sales of spare parts.



Unit	1957		1958	
	Number	Value in Sw. Kr. 1,000	Number	Value in Sw. Kr. 1,000
Cars .....	41,488	341,120	53,360	450,214
Trucks .....	14,309	273,990	15,448	275,732
Bus chassis .....	1,082	33,109	1,323	38,057
Tractors .....	706	8,528	21	230
Engines .....	—	28,153	—	34,533
<b>Total .....</b>	<b>57,585</b>	<b>684,900</b>	<b>70,152</b>	<b>798,766</b>
<i>Of which exported ..</i>	<i>24,066</i>	<i>253,837</i>	<i>31,911</i>	<i>312,300</i>

The heading "Engines" concerns mainly AB Penta's marine and industrial engines.



*The four-door, five-seater Volvo 122 S.*

ing abreast where manufacturing methods and styling are concerned. Opposed to this, or perhaps just because of it, the work is intensely stimulating. When we started and reckoned out that we should manufacture 8,000 vehicles the third year to ensure a profit-making organization, we showed ourselves to be too naive as far as the rate of development was concerned but unnecessarily pessimistic concerning the volume required in order to show a profit. In spite of this, for my own part, I have always considered through the years that the really important thing was to strive for increased productive volume while increased profits, or rather immediate profits, are of secondary importance. It seemed to me that through increased volume, the profit side would gradually be looked after. That is why when various occasions have risen causing conflict between a desire for profit and chances for increased production volume, my decision has usually been to the advantage of production volume. The more vehicles we had on the roads the easier they were to sell or, as one of our overseas agents expressed it: One customer won is ten customers won, one customer lost is ten lost. One absolutely clear subsidiary speculation in this argument is spare parts sales which were reckoned to follow in the track of vehicle sales and which,

gradually, would become the permanent part of the business transacted which would be maintained comparatively unchanged even in a trade depression. To use a particular similarity one can say that the automobile manufacturer and the dealer in the spare parts shop have a small possibility to obtain tax-free profit adjustment. They can sell automobiles for the lowest possible profit in order to attain maximum production volume and make the profit instead later in the sales of spare parts.

Another side of the picture, the importance of which I only realized gradually, was the service side. As a matter of fact in the motor vehicle branch in general there has been a slight variation of definition: Earlier it was vehicles that were sold, today it is transport units. This is true, naturally, primarily from the point of view of the vehicle manufacture but also, as far as trucks and buses are concerned, from that of the customer.

For me, this variation became reality during the war years. Foreign makes had a particularly hard time during these years to supply the necessary spare parts for their models in Sweden while Volvo owners could run their vehicles as usual without having to wait a long time for spares.

A French industrialist put it this way: "The price of a commodity is a one-time worry as is

also delay in delivery but the quality of the commodity in question concerns me all the time".

This concerns automobiles perhaps to a greater degree than anything else.

For this reason, during the war years greater stress was placed on Volvo's efforts to extend its service so that the performance of the vehicles during their whole lifetime would satisfy the customers. In the first place this meant that our dealers were persuaded to build practical, modern workshops with a capacity large enough to ensure that the customers would never have to wait to have their vehicles serviced. On top of this, stricter and more regular checks were carried out to ensure that the customers would never have to wait to have their vehicles serviced. On top of this, stricter and more regular checks were carried out to ensure that all dealers carried a complete stock of spares. We, ourselves, started to pay more attention to the production of service literature, service manuals, instruction books and so on as well as the production of special tools to simplify repair work aiming towards both lower repair costs and shorter repair time.

Finally, when designing new models, we placed more in the foreground than earlier the question of accessibility, easy replacement and simplified repair procedure on the whole.

The PV 444 guarantee, which is so well-known in Sweden and was introduced a few years ago, covers collision damage and other forms of damage. This guarantee is the end product of our service efforts. As far as this automobile-which is mass-produced to a high degree-is concerned, we have managed to reduce repair costs to such a low level that we were able to relieve the customer of these costs within certain limits and, thanks to the keener competition we could offer, we sold so many

more automobiles that the profit from these could balance and even exceed the total value of repair costs involved through the guarantee.

Finally a reflection concerning the general feeling in the company. When we at Volvo, at the beginning of our activities, began to have contact with the automobile industries in the United States from a purchasing and study point of view, we were surprised by their unreserved attitude and their readiness to impart information concerning their work, both from designing and manufacturing viewpoints. We were allowed to see all we wanted to see. We asked question about all sorts of things and received detailed answers. This frankness was not limited to us as foreigners but seemed to apply just as much internally in the United States as a whole. I found this frankness extremely appealing. I had arranged things at Volvo so that we all sat in one large office where each one of us could follow everything that happened and everything that was said and I made a practice of openly discussing Volvo business with anyone who was interested. Later I made a rule of giving as detailed information as possible concerning the activities of the company in the Annual Company Report and attempted to train Volvo employees to have the same point of view.

I am convinced that the frankness and sincerity of Americans has been an important factor in the rapid progress maintained in the United States and I believe that co-operation and relationship between individuals would be better, more productive and more pleasant if this mentality became more general.

