

# From sound to Nausea

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## FROM SOUND TO NAUSEA

### Swissair Tackles Noise

by MM

When the Zurich electorate voted for an intercontinental airport in May 1946, the biggest civilian aircraft hardly ever weighed more than 45 tons. The message elucidating the reasons for the proposed airport said that it was to be expected that within the following 15 to 20 years machines of over 90 tons would be operating on regular air routes. The Zurich voters approved the scheme, but even the most optimistic did not foresee that before the period had elapsed, Swissair would have a Convair-Coronado with over 110 tons maximum take-off weight and even a 140-ton DC-8 in service. Technical progress had gone forward in leaps and bounds.

In 1958, Zurich Airport was officially opened — one of the most modern in Europe. But this generously conceived airfield was soon no longer adequate, and the arrival of the jet age made an extension imperative. The so-called "second construction stage" is nearly completed, and already it is evident that air communications of the future will require even larger and more modern airports. The ever-growing jet planes require longer runways, the astronomical increase in passengers means more aircraft, crews and staff. (In the last year before the war, 41,000 passengers were registered at Duebendorf Airport. In the first twelve months at Kloten, the number had more than quadrupled. And last year, over 3 million air passengers passed through Zurich Airport. The figures for freight have increased even more, from 1,800 tons in 1949 to 50,000 tons last year. It is no longer just the expensive or perishable goods like flowers, fruit, precious metals which are being transported by the large freight carriers of today, but cargo of almost any description, and with the arrival of the Jumbo Jets, container transport by air will become commonplace.

With this tremendous uplift, problems have not only kept abreast, but they have appeared in the course of the years in realms where nobody had ever expected difficulties. One of these is noise.

#### Where does it come from ?

The modern city man has so accustomed himself to the ever-present background of sound that he takes considerable time to get used to the complete quiet of the countryside. *Vice-versa*, the country dweller finds the noise in town a nightmare.

The Oxford dictionary tells us that the etymological origin of the word noise is dubious. Though according to the eminent German philologist Friedrich Diez (1794-1876) who was Professor of Romance languages in Bonn, the word noise is derived from the Latin *nausea* (sea-sickness, disgust, annoyance), the Latin word having been borrowed from the Greek. This puts an aspect on the term, which aptly describes the effect of an overdose of sound. The limit where the crucial point between enough and too much is reached, varies according to the individual. If we are to believe the experts, noise, even while we don't consciously register it, does untold harm to our systems. The Basle neurologist Dr. Hans R. Richter produced a film early this year "Noise kills us". This documentary is based on extensive scientific research, and with it, Dr. Richter set out to prove the disastrous effects of noise while we are asleep.

The problem is being studied the world over. In Switzerland, much has already been done, and the Anti-noise League has become quite an important organisation. In spring, it opened an institute in Zurich with the aim

of testing and assessing all aspects of noise. It is to serve scientific and practical/technical noise abatement, especially by testing materials, apparatus, installations and methods. Prof. H. Weber, Director of the Institute of Telecommunication Technique of the Federal Institute of Technology (ETH) and head of its laboratory for Applied Acoustics, has been elected President.

The ordinary citizen may not be consciously disturbed so much by air traffic in his daily life or nightly sleep. He often notices the passing of an aircraft only by the cloud-like vapour trail. During the war, it was different. We remember how we were affected by the noise of aeroplanes. At that time, we either feared their sound when we realised that they were hostile aircraft aiming to attack or hailed it with weird satisfaction when they were RAF planes on a mission over enemy territory. After the war, it began to get increasingly clear that more and more aircraft would mean more and more noise. With piston-engined aeroplanes, there are two sources of noise, the unpleasant high swishing noise when the propeller blades cut the air at high speed, a high-frequency noise which quickly abates as the aircraft rises. The exhaust noise is worse. With the jet planes, it is the compressors which create a loathsome, shrill sound of high frequency, which, however, is only noticeable in close proximity. It is surpassed by the dull thundering of the hot gas exhaust. It is this noise residents in the wider vicinity of a busy airport began to get alarmed about, whilst an outcry of protest came from the inhabitants in very close proximity of an airfield.

#### To Guard the Citizen

In Switzerland, a protection society for the population around Zurich Airport was founded last November. The following Communes belong to it, with a total number of about 35,000 inhabitants: Bachenbuelach, Buelach, Daellikon, Hochfelden, Hoeri, Lufingen, Niederglatt, Niederhasli, Oberglatt, Regensdorf, Ruemlang and Stadel. Its aim is to protect the inhabitants of the district against aircraft noise and other bad side effects from air traffic, such as exhaust fumes. It also advocates the upkeep of vital natural reserves, such as forests and green spaces. Its first task is to gather and study all available information on aircraft noise and to co-operate closely with the Cantons and the Confederation and, needless to say, with Swissair. It wants to create a counter balance to the already existing organisations which are interested in air traffic such as IATA (International Air Transport Association) and ICAO (International Civil Aviation Organisation). The latter recently decided, for instance, to study the issue of noise certification, an effort which so far had been frustrated by countries with large aircraft industries.

In the last annual report of the Federal Department of Communication and Energy, it was stated that the discussion regarding aircraft noise had become intensified again, and that Switzerland had tried to speed up the work in this direction of international organisations dealing with aircraft noise abatement.

Legislation is a federal matter and lies therefore with the above Ministry. Any prohibition relating to aircraft noise or hours of operating in the air or in the workshops on the ground would have to be issued from them. In Basle, incidentally, the French Government would have a say as well. A new aviation law has been drafted and has been submitted to the relevant organisations and Cantons

for consideration under the *Vernehmlassungsrecht*. Ordinary regulations as to noise, like so much else in Switzerland, are a matter for the Cantons. As early as 1960, the Zurich Ministry of Works (*Direktion der Oeffentlichen Bauten des Kantons Zuerich*) issued rules and regulations regarding aircraft noise at Kloten Airport.

As from 1st May this year, these have been tightened up. Aircraft which generally on take-off register more than 95 db/a are no longer allowed to operate between 10 p.m. and 6 a.m. (hitherto 1 a.m.). In parts of Kloten, at Oberglatt and Ruemland where noise causes most disturbance, microphones are installed which transmit recordings by cable to the airport where sound measuring installations came into service in 1966.

### Anxious to Help

Swissair have been devoting great care to the noise problem for years and are trying to do their utmost to alleviate the nuisance. From the outset, they co-operated with IATA. Swissair played an active part in developing a take-off and climb-out technique which reduces the noise level in the vicinity of airports and below the flight path. Zurich Airport Authority was the first in Europe to adopt this procedure and made it compulsory for all aircraft. Swissair pilots also apply it at all foreign airports, regardless of whether special regulations operate or not. In addition, the airport authorities have worked out special routes for aircraft taking off and touching down. Some of the check flights which, according to international safety regulations all pilots have to undergo at regular intervals, take place in Geneva or Basle. Basle Airport, incidentally, is to be improved and enlarged with a view to diverting some of the traffic from the Glatt Valley to the "Golden Gate of Switzerland" on the Rhine.

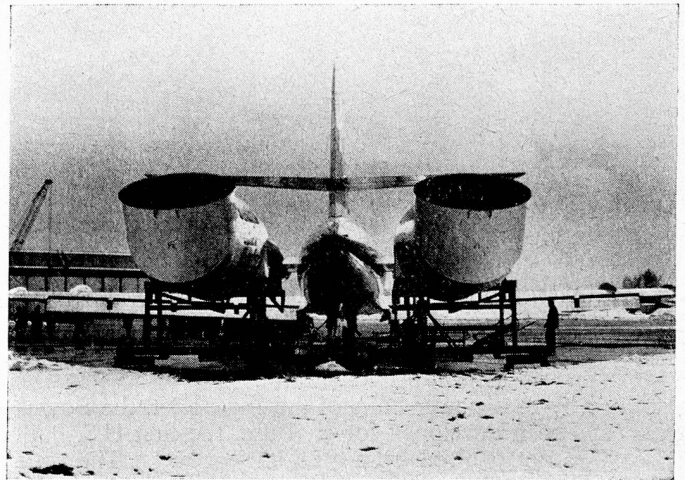
### Commuting to and from Vienna

Last January, the Zurich Cantonal Parliament agreed to a further credit of 1.2 million francs to finance the studies for the third stage of the airport extension programme. Swissair took the opportunity of the general debate to inform the public of their efforts in noise abatement. They invited some journalists and photo reporters to visit their training establishments in Vienna and Bratislava. This followed the decision the Company took a few years ago to carry out flight training abroad in order to reduce noise by training aircraft to a minimum inside Switzerland. Naturally, such displacement is not only costly, but it has also certain operational limits. As Swissair has no jet training aircraft, instruction has to be given on line aircraft which have to be taken out of service and thus become an economic liability. Needless to say, a minimum number of take-off and landing operations must take place at the home airports so as to make pilots familiar with their specific conditions. Nevertheless, Swissair took an enormous additional cost and began, in 1961, to train jet crews at airports abroad which carry less traffic and where noise is less of a problem, but which answer the technical requirements. Even DC-3s which cause few complaints were taken outside Switzerland for training purposes.

At the beginning, the Swedish Airport of Arlanda was chosen for the new DC-8, and gradually more and more foreign airports have been added to the list, such as Genoa and Turin, Nuremberg and Stuttgart, Lyons, Wevelgem (Belgium), Vienna-Schwechat and Bratislava in Czechoslovakia, which has been in use since last year and is particularly suitable. Vienna is used as base for

instructors, engineers, pilot trainees and the DC-9 jet used for training. Last year, the men numbered 4, 10 and 18 respectively. In 1968, a total of about 100 will be trained there, all of them already experienced on other types of aircraft. In 1967, 83% of all training touch-downs with jets took place abroad; only 11% were made in Zurich. Landings with the new short-haul aircraft, the DC-9, were carried out outside Switzerland to 98%.

Pilot training will always be a costly business, and its removal to foreign airports adds considerably to the expense. In 1966, Swissair spent 12.5m. francs on the training of their pilots, a year later already some 18m. and for 1968, over 20m. has been budgeted. A few of these millions could be saved if all training took place at home airports, but Swissair want to make a contribution towards the satisfactory solution of the noise problem.



*Caravelle engines being test-run with silencers in position.*

### Strange the Beast

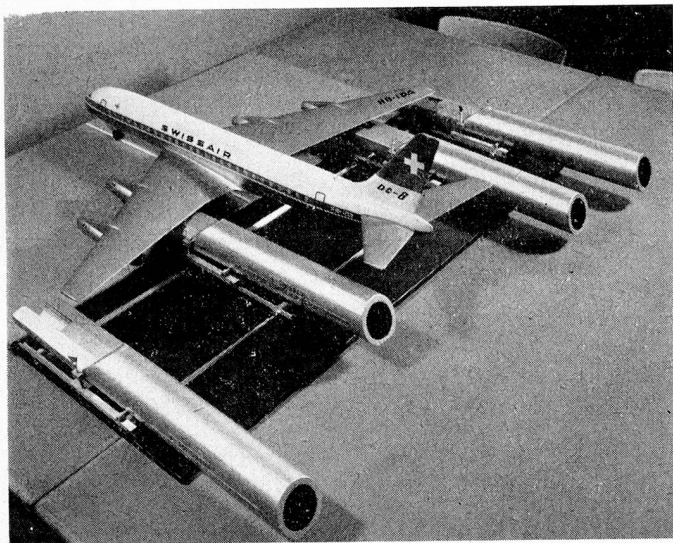
Most aircraft have some silencers attached. Even the Dornier Do-27, Swissair Photo A.G.'s survey aircraft HB-FAA, has recently been equipped with sound mufflers fitted under the fuselage to reduce the noise of the piston engine. They enable the noise level to be reduced by 15 to 20 decibels (a).

A pressing source of complaint is the intensive noise created by running the engines of a stationary aircraft for test purposes. Such runs are prescribed by the makers in conjunction with the Federal Air Office. In 1951, an engine test house for overhauled engines became operational which had a horizontal noise muffler built at its side, weighing over 50 tons and measuring 30 metres in length. This contraption eliminates the colossal noise of a jet engine running at full speed and reduces it to such an extent that it is noticeable outside the building only like that made by a lorry.

As for the running of engines of a stationary aircraft, years of research in co-operation with scientists have shown that the only effective and really practicable solution lies in the use of mufflers set up on a rig and connected to the engine exhausts. Last year Swissair introduced equipment of this kind for short-haul jets, and similar silencers for four-engined jets will be put into operation later this year. A second mobile noise muffler installation for test running short-haul jets has been scheduled for 1969.

The whole problem is not just that of simply cutting out all noise. It is unreasonable and unrealistic to expect a noiseless aircraft, however determined designers and

manufacturers may be to reduce noise at source. It is interesting to note, however, that modern aircraft makes less noise than the first generation jets. So, for instance, none of the DC-9s Swissair have in use, has been "caught" by the sound measuring installation. This leaves hope, even with the era of air buses fast approaching.



Model of silencer installation which Swissair is to put into operation later this year for test running jets of four engined aircraft. The silencer tubes are mounted on rails, making them easily adjustable for different aircraft types.

#### Dawn of the Jumbo Era

The by-pass power units of the Jumbo jet, the Boeing 747, have been developed for civil use, the first U.S. built jet engines not evolved from a military model. The ratio between the cold secondary air stream and the hot primary gas stream, which has hitherto been about 1.5:1, has been increased to 5:1, resulting in an appreciable reduction in noise. Furthermore, Swissair have received a guarantee that the noise level will be slightly *under* today's average. This means, the fear that the arrival of the Jumbo jets brings extra noise, is largely unfounded.

At the end of 1967, Swissair had 27 jet aircraft, 6 piston aircraft, one BAC-111 chartered from British Eagle and two F-27 operated by Balair. In 1968, the turbine powered fleet is being increased to 32 long, medium and short-haul jets, and three F-27, the piston-engined CV-440 being phased out. For the following years, nine long- and short-haul jets have been put on order. At the end of last year, a purchasing agreement was signed for two giant Boeing 747. In the B-747 version which Swissair has chosen, the line will carry a crew of 19, 32 first class and 321 economy class passengers, plus up to 10 tons of cargo, non-stop from Switzerland to New York — at 920 km per hour.

It is hoped that town and country planning authorities will refrain from encircling airports even further, a tendency which has added unnecessary difficulties. A town like Kloten had a population of 3,700 when the Airport was begun — today there are 15,000 inhabitants. The building boom has made similar "progress" in other Communes nearby.

In order to cope with the problem, there must be goodwill on all sides to agree on a level of tolerance. Swissair will continue without remission to help reduce the noise nuisance as far as permissible without impairing the safety of operations. Furthermore, although they are a commercial undertaking, big profits are not their

aim as they consider themselves a public service. They are nevertheless dependent on economic self-sufficiency, for, although they are Switzerland's national airline, they are not government subsidised. Switzerland benefits greatly from aviation, especially the Cantons which run the airports, and a certain amount of noise, however regrettably, must be accepted. With technical progress and the right attitude it should be possible to prevent SOUND from turning into NAUSEA.

(Photos by courtesy of Swissair.)

### SWISS IN GREAT BRITAIN IN THE EIGHTEENTH CENTURY

by  
Béat de Fischer

(Former Ambassador to the Court of St. James's.)  
(Continued.)

#### III

Numerous also were the Swiss, Genevans and Neuchâtelois who, in the eighteenth century, discharged special functions at Court, whether at Whitehall, St. Theobald and St. James's, or at Hampton Court and Kew. They were almost always French-speaking, and often pastors or pastors' sons, whose appeal lay mainly in the fact that they were both Protestants and heirs to the French civilisation.

William III had as his preceptor Samuel Chappuzeau. When he became King of England in 1688, he took with him his bodyguard of 50 Bernese who, as tradition says, entered London to the strains of the 'Bernermarsch'.<sup>23</sup> As his physician, he took over from his predecessor Sir Theodore Colladon (d. 1707), of Geneva, the chief medical officer at Chelsea Hospital, whose last descendant, Anne Colladon, left a considerable part of her fortune to the French Hospital, to which Swiss were also admitted. Sir Theodore's successor was Etienne Rougeat, another Genevan. On scientific matters, King William liked to refer to Nicolas Fatio, Newton's friend. It was he who tried, though without success, to persuade Firmin Abauzit to leave Geneva for Cambridge.

Queen Anne had in her Palace Guard three Swiss captains: Pachoud, Bonnard and Delachaux; she had no doubt inherited them from her brother-in-law.

From the time the Protestant Hanoverians arrived in England, the Swiss and Genevan colony, with its large Reformed majority, had excellent relations with them. In 1745, when the second Jacobite rebellion broke out, it offered to levy in support of George II a 500-strong battalion which could be mobilised within 24 hours. This volunteer corps, organised by Sir Luke Schaub, however, never saw action, but the sovereign reviewed it and handed to it on that occasion a flag which is still in existence, and which is similar to those of the Swiss regiments in France.<sup>24</sup> The inscription on the cross of the Colour seems to have been: 'Ubi libertas ibi bene'.

George II, who had a marked aversion to all he called 'bainting, blays and boetry', was nevertheless fond of masquerades. It was the peculiar 'Swiss Count', the J.-J. Heidegger, of Zurich,<sup>25</sup> already mentioned, who became his rather licentious Master of the Revels. The severe Andreas de Planta, on the other hand, was appointed Italian Reader to Queen Caroline. F.-O. Petitpierre and Joshua Amez-Droz (d. 1793) were teachers of French and tutors to the future King George III, and he had George Michael Moser as his drawing-master. Gaspar Wettstein acted as chaplain, English teacher and librarian to the Prince of Wales, who even sent him to Gotha on a delicate mission to his future fiancée.