

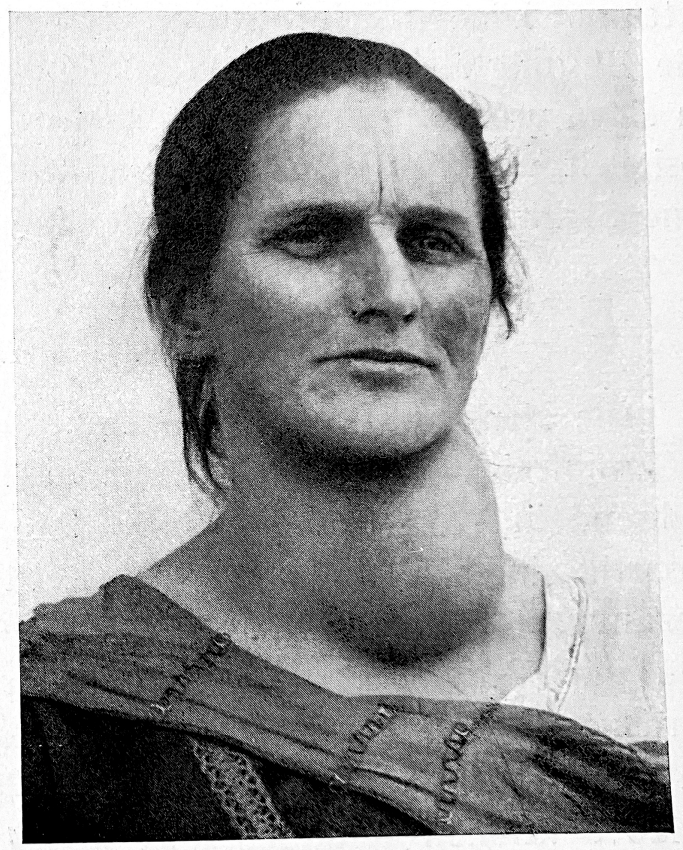
The history of iodine deficiency in Switzerland

Historischer Rückblick auf Jodmangel und Einführung von Jodsalz in der Schweiz

Jonah Goodman 6.10.2022

Hello, I'm a journalist and I did extensive research on Switzerland's history of iodine for a long article published in Das Magazin, Tages-Anzeiger almost three weeks ago. What made it a story for a journalist is that although this history is well-known in nutritional science, it was almost unknown to the general public.

The scientific and medical aspects of my research were checked by a world expert in the field, and Das Magazin applied the same high standards to historical sources as it does to any other sources.



One hundred years ago, in 1922, Switzerland was an outlier. No other country on record was as affected by the strange diseases that plagued the Swiss people: from large towns to remote farms.

The problems were known elsewhere, but in the sheer scale and severity of their impact, nowhere came close to Switzerland.

The most visible mark was the goitre, a pronounced swelling of the neck.

If we look at conscription data from the time, in 1921, up to one third of 19-year-old conscripts had a goitre. In Luzern and Obwalden, one in four were exempt from military service due to goitres so large that they struggled to breathe.

For every man with a goitre, three women would have suffered from the condition.

And children were the most vulnerable of all: in 1922, here in Bern, municipal records show that 94% of schoolchildren had abnormal swelling of the neck, and almost 70% had a goitre.

There were invisible symptoms, too.

Across the country, one in 600 people were born deaf – an unrivalled rate, five times higher than the international norm. In the canton of Bern, that number was one in 200 – fifteen times higher than the norm.

Many people suffered from brain fog; a constant sense of exhaustion, of depression. Where the problems were at their worst, villages were unnaturally quiet – without the sounds of everyday rural life, or children at play.

In the worst affected places, one in ten babies was born a cretin.

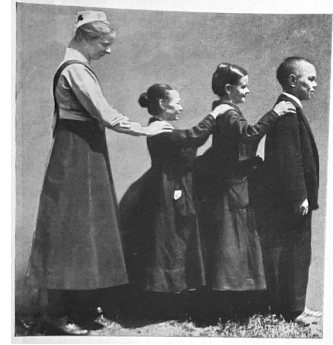


Image credits (including previous page):
Hans Eggenberger, 1928

People with cretinism cannot hear or speak. Their brains are so severely damaged that their mental world never develops beyond that of a one-year-old child. They grow to be around 120cm tall, and have peculiar, compressed facial features, thick skin, thin hair, and distended bellies.

In 1922, there were 5,000 cretins in Swiss institutions, but many lived in the community with their families. They were a familiar sight, sat in town squares or stood along the sides of roads, often smiling.

Cretins can live a normal human lifespan, and caring for them fell to communities — Swiss women in particular — already struggling with goitre, brain fog and exhaustion.

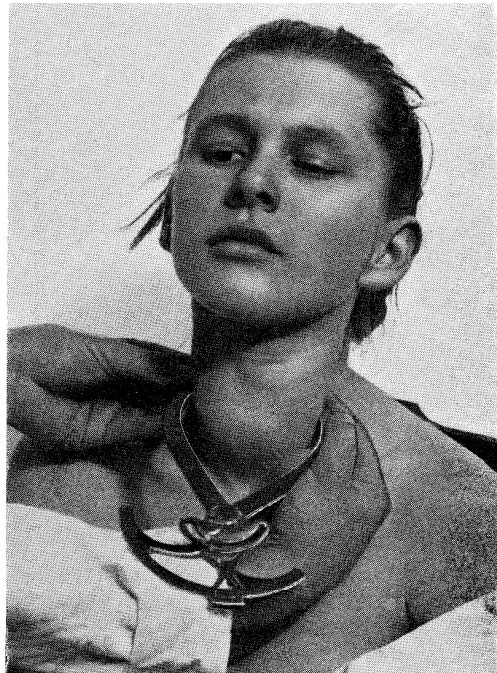


Image credit: Fritz de Quervain, 1924

These problems were not new. They are noted in the first written records of the alps, made by the ancient Romans.

But in the 19th century they became the great medical mysteries of Europe, explored by everyone from armchair enthusiasts to the greatest minds in medicine: from Alexander von Humboldt to Theodor Kocher.

The diseases seemed geographically limited to the alps, and an incredible range of theories about them were formulated, some more scientific than others. Researchers blamed the air pressure, snow melt, sunlight, bad beer, and, in a very 19th century way, “moral failures”.

A list of the best theories was published in 1876: it contains 40 competing hypotheses.

One issue was that data collection was patchy and unreliable. But in 1883, Dr Heinrich Bircher, a lecturer at this university, published an exhaustive survey of goitre in every community in Switzerland. He showed the shocking extent of the problem.

Although numbers were relatively low in Ticino, Vaud, Neuchatel and Geneva, they were spectacularly high in the other cantons.

In the area around Jegenstorf, 14 kilometers north of where we are now, up to 94% of young men had large goitres. In Rumendingen, 25 kilometers north east from here, one third of the inhabitants were deaf.

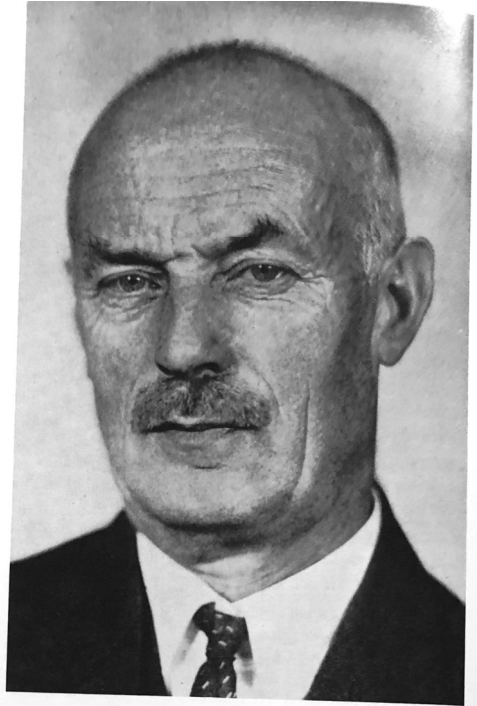
And the map revealed clear borders: in Aargau, for example, the village of Kaisten was heavily afflicted, but Effingen, just six kilometers away, was not.

Research began to focus on finding a microbe responsible for goitre. And then, from the turn of the century, race theorists – eugenicists – joined the hunt, looking for genetic faults in the people of the alps.

But in the end, the solution did not come from these schools of thought, or a university, research institution or hospital. It came from...

Heinrich Hunziker

Adliswil, Zurich



...this man, Heinrich Hunziker. He was a country doctor, a Landarzt in Adliswil outside Zurich.

Hunziker was a young man of 34 when, in 1914, he gave a speech to a small local medical society in which he argued for a theory of iodine deficiency.

Iodine had been discovered in 1811, and was known to have some medicinal qualities, including as a goitre treatment, but it was also considered dangerous, poisonous: it was known to cause Jod-Basedow, a truly frightening condition that gives patients bulging eyes, causes uncontrollable tremors, and can kill.

Hunziker said that this apparent poison – iodine – was actually a kind of food which people need in extremely small doses in order to create an essential “secretion” in the thyroid gland.

It was a beautifully comprehensive theory. Hunziker explained goitre as an adaptation to a lack of iodine – the thyroid expands in order to filter more iodine from the blood. He said that birth defects including cretinism were the consequence of iodine deficiency in the mother in the first trimester of pregnancy. He said that the feared Jod Basedow was brought about by massive overdoses of iodine.

Everything he said turned out to be true, but it took another 40 years for it to be proved, in 1954.

What Hunziker could not explain was why there was so little iodine in the alps. But this is something we do now know:

Iodine can be found, to a greater or lesser degree, almost everywhere in the world, usually as a legacy of prehistoric seas and oceans.

But not in Switzerland. In the last ice age, a huge ice sheet formed over the Alps. Over 1 million years, it ground, tore and washed away the top 250 metres of rock and soil from the surface of the Swiss Plateau. It stripped Switzerland of its iodine. In 1964, Dr Franz Merke, from Basel, showed that the extent of the ice cap “corresponded precisely” with maps of historic goitre prevalence in Switzerland.

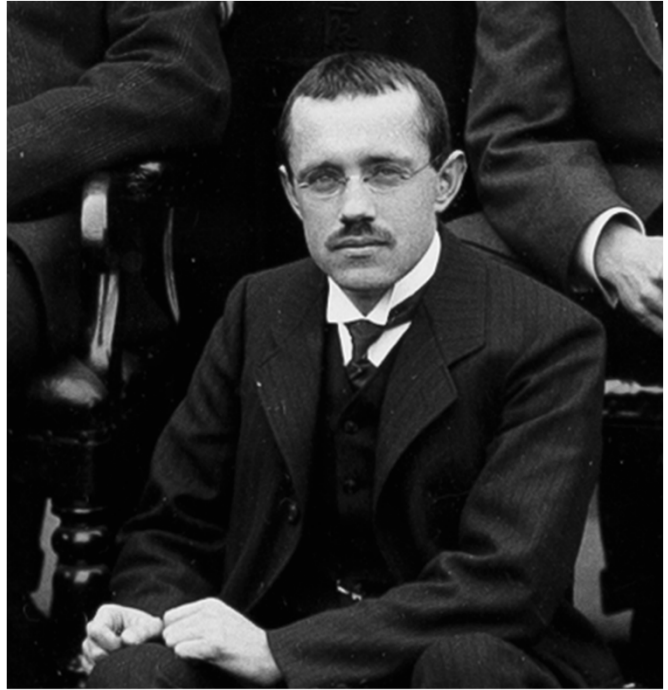
But for Hunziker, a practising doctor, the most important thing was to find a treatment for his patients. So he proposed, as a preventative measure, a microscopic daily dose of iodine delivered in a commodity that we self-administer every day: table salt.

Hunziker’s theory made waves in the Swiss medical establishment, and triggered a heated debate. There were real fears that a proposal to iodise salt would provoke Jod Basedow on a national scale – mass poisoning.

But, following the debate, on the other side of the country, was...

Otto Bayard

Zermatt, Valais



Otto Bayard. Another country doctor, a couple of years younger than Hunziker.

Bayard recognised that the real question was one of dose. So, entirely on his own, he decided to find out what the minimum effective dose would be.

To do that, he devised a new kind of experiment: an early version of what is called today a dose-response trial.

Zermatt, in those days, was very remote, especially in winter. Bayard used a mule to get around, sometimes travelling 20 hours to see a single patient.

Now, using a snow shovel, Bayard mixed potassium iodide into salt at five different concentrations, and distributed them to five families in a remote, goitre afflicted village. He made sure that the cows received iodised salt, too, for their milk. And he gave it to the bakery, to ensure that even the food they bought was iodised.

The experiment went on for five months, and proved a stunning success. Even the family taking the weakest dose of iodised salt all but lost their goitres.

So – this time with government funding – Bayard took his tests to the next level: two whole villages in the Valais Vispताल: 1,100 people across all age groups and demographics.

It was another success. After six months, goitres had disappeared, and nobody had been poisoned. For the very first time, a solution to the national problem seemed possible.

So, in January 1922, Bayard and Hunziker were invited to join a newly formed panel of 16 experts in Bern: the Kropfkommission – later renamed the Swiss Jod und Fluor Kommission. With the exceptions of the two family doctors, these experts were drawn from the highest levels of Swiss institutions: universities, federal bodies, hospitals, the army.

They were far from agreeing *why* iodised salt was effective, but Bayard's results spoke for themselves. The salt seemed to work.

But then things got difficult. How do you give it to people? Do you make it compulsory? Do you offer people a choice? Can you trust them to make the right decision? Should it even be a secret programme?

More complicated still, in a Swiss tradition going back to the middle ages, each individual canton held monopoly rights on the sales of salt within its borders, meaning the cantons would have to approve iodisation one by one.

That meant politics. And it leads us to another extraordinary member of that Kommission:

Hans Eggenberger

Herisau, Appenzell
Ausserrhoden



Hans Eggenberger was the same age as Bayard, and the chief doctor at the hospital in Herisau, Appenzell Ausserrhoden.

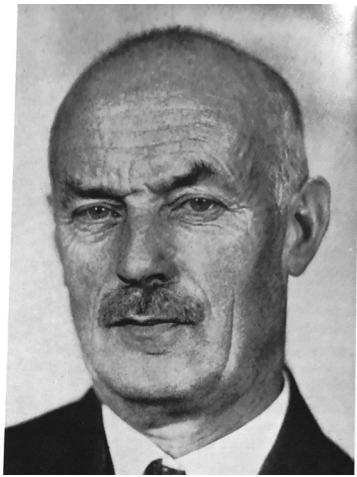
Immediately after the January commission meeting, he filed an initiative with his canton to support the sale, manufacture and delivery of iodised salt.

And then he launched a breakneck lecture tour of Appenzell Ausserrhoden – by reputation, one of the most conservative cantons in the country.

Night after night, Eggenberger drove the hospital ambulance to small communities, set up his colour slide projector and explained to ordinary people the case for iodised salt. He visited every community in the canton in just three weeks.

His initiative passed. And so, just one month after the Kropfkommission meeting, iodised salt went on sale in Appenzell Ausserrhoden: not imposed from above, but by popular demand.

Eggenberger proved that, if it was explained to them in the right way, people would make the best choice for their wellbeing.



On June 24th 1922, the Kropfkommission met again, this time to decide whether iodised salt should be made a national project.

Today, food fortification is a global phenomenon, but in 1922, nothing like this had ever been done before. The experts on the commission did not know if their actions would save the country, or provoke a national disaster.

But they made that brave decision, and formally recommended iodised salt to the cantons. Within a year, it was on sale in 17 cantons, and the rest of the country soon followed.

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That's the theory, the science, and the politics, but no less important was production: the support from industry to put high quality iodised salt on the shelf in shops.

For that, we have to thank the Vereinigten Schweizer Rheinsalinen – known today as Schweizer Salinen – which was then the exclusive supplier of salt to every canton but Vaud.

Soon after the commission's recommendation, Schweizer Salinen began to industrialise salt iodisation, and in November 1922, it started to deliver the new salt to cantons. Crucially, it made iodised salt available at the same price as non-iodised salt, despite the extra work involved to produce it.

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By 1930, wherever that salt was used, goitre had disappeared in everyone except older people. The national rate of deaf-mute births fell from one in 600, to one in 3,000 - level with the international norm. Across the country, schools for deaf-mute children closed their doors. The brain fog lifted. Since 1930, not a single cretin has been born in Switzerland.

It's an incredible success story. Almost a fairytale. But I want to leave you with the words of the great Hans Eggenberger.

Writing in 1928, as iodised salt was transforming the society around him. Eggenberger could already see "wie rasch der Mensch frühere Plagen vergißt und in den Maßnahmen zu deren Verhütung wieder nachlässig wird." He foresaw how quickly people forget the past and its dangers, and how easy it is to take the things that protect us for granted.