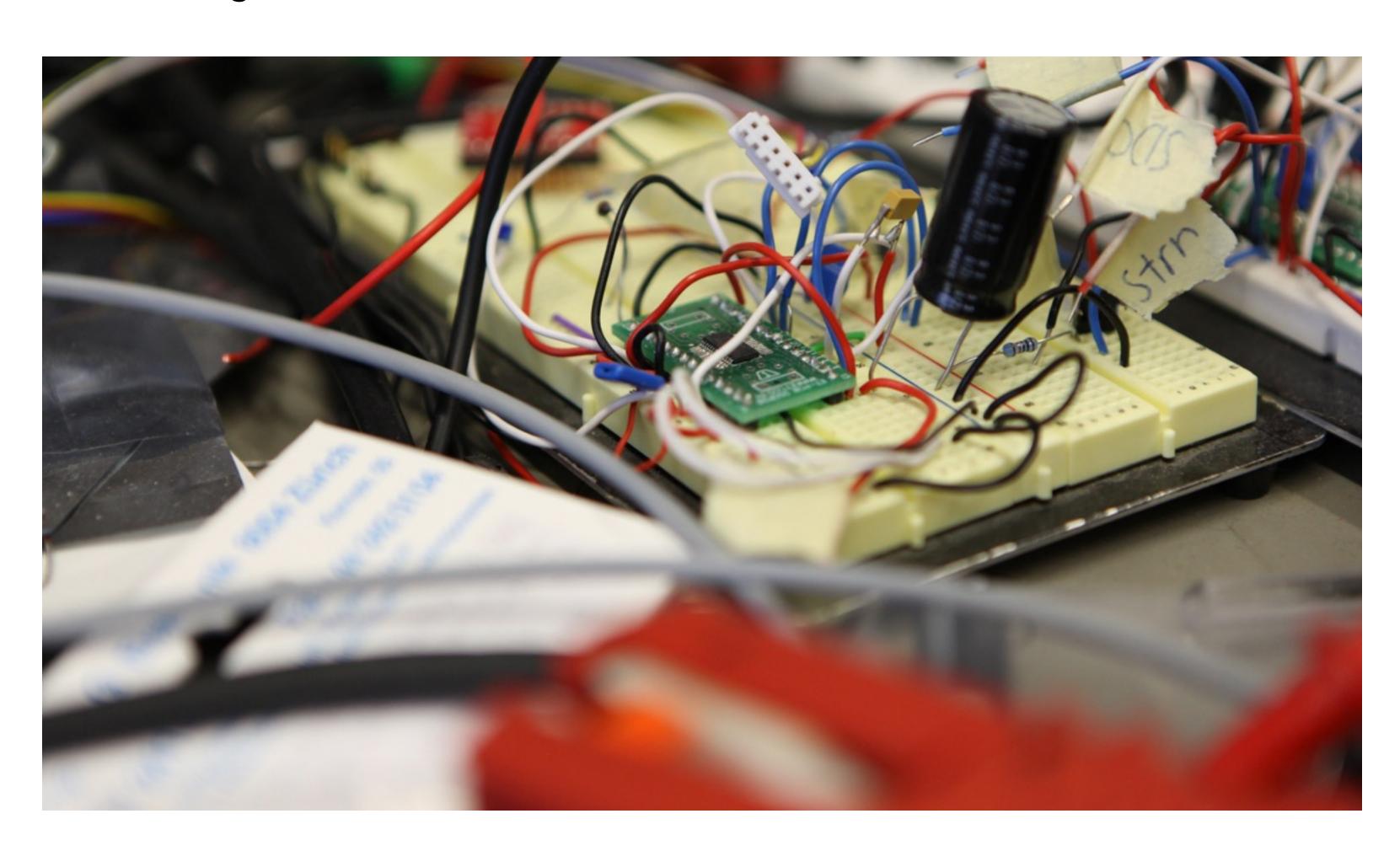
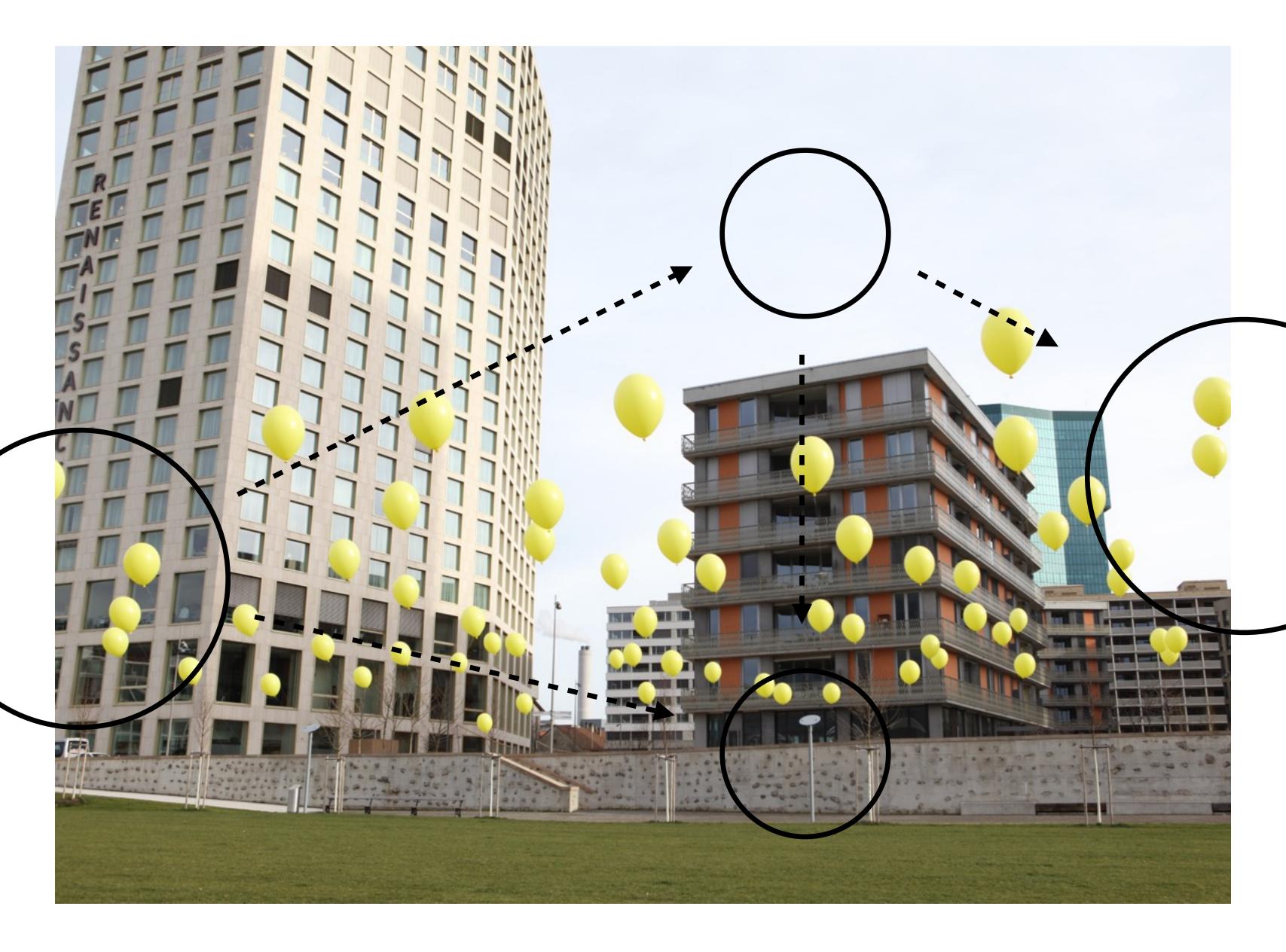
interaction design

physical computing in the broadest sense, means building interactive systems by the use of hardware and software that can sense and respond to the analog world.





the history of technology is the history of the invention of tools and techniques and is similar to other sides of the history of humanity.

wikipedia

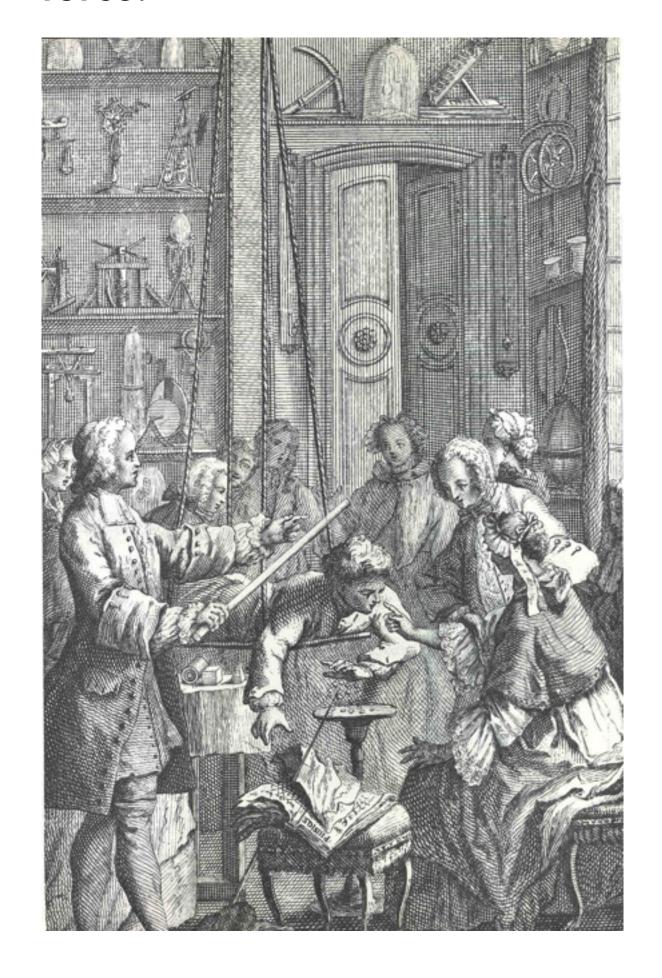
one of the major driving forces behind the development of tools and techniques is the curiosity of people and their urge to understand (natural) phenomena.



benjamin franklin has been one of the first to engage into thunderstorms and lightning. therefore he prepared experiments with simple kites, trying to trap lightnings.

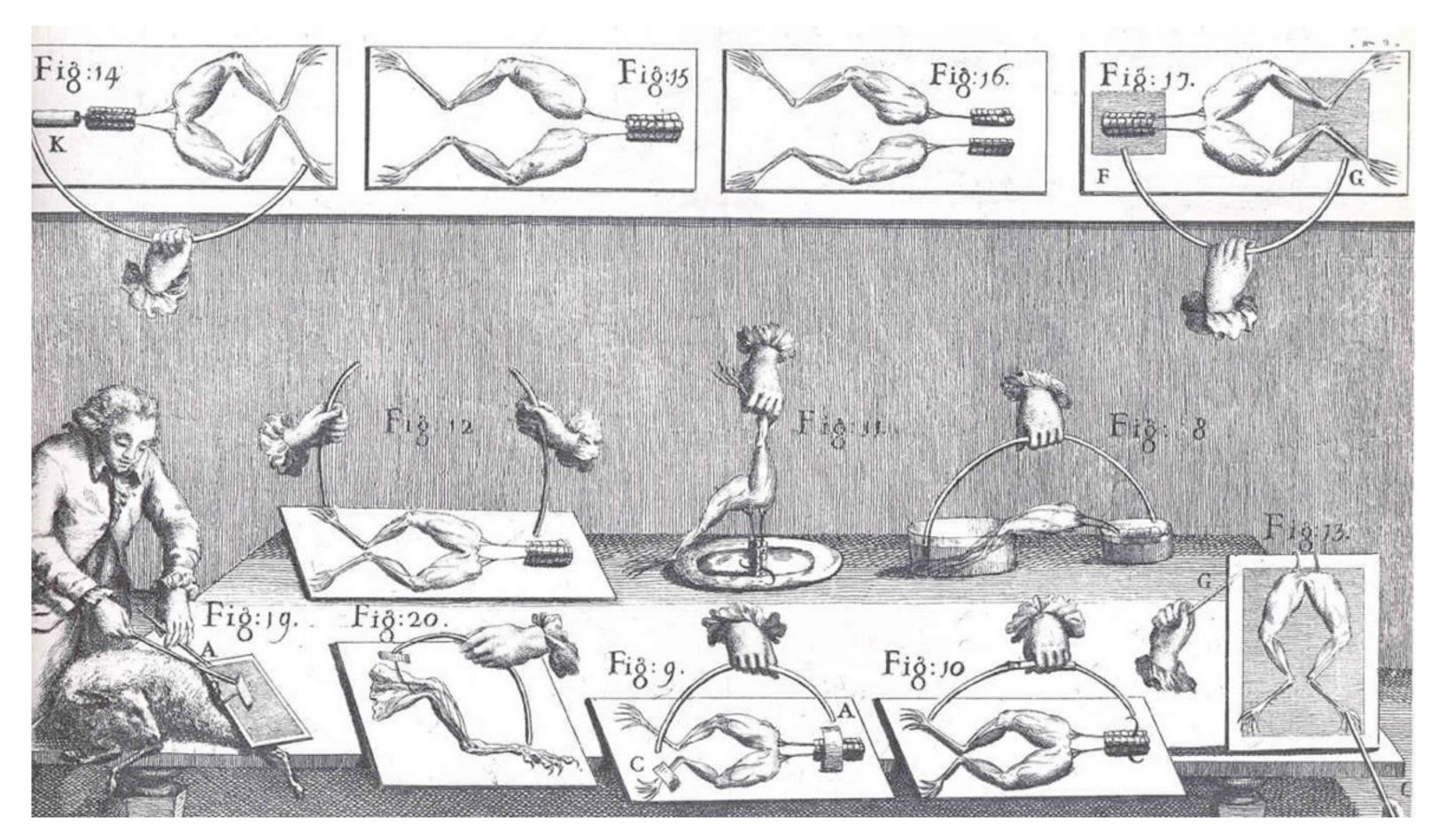


some so called 'magicians' used the invisible power of electricity to capture peoples attention. although they weren't aware of the physical rules and principles they experimented with this invisible force.

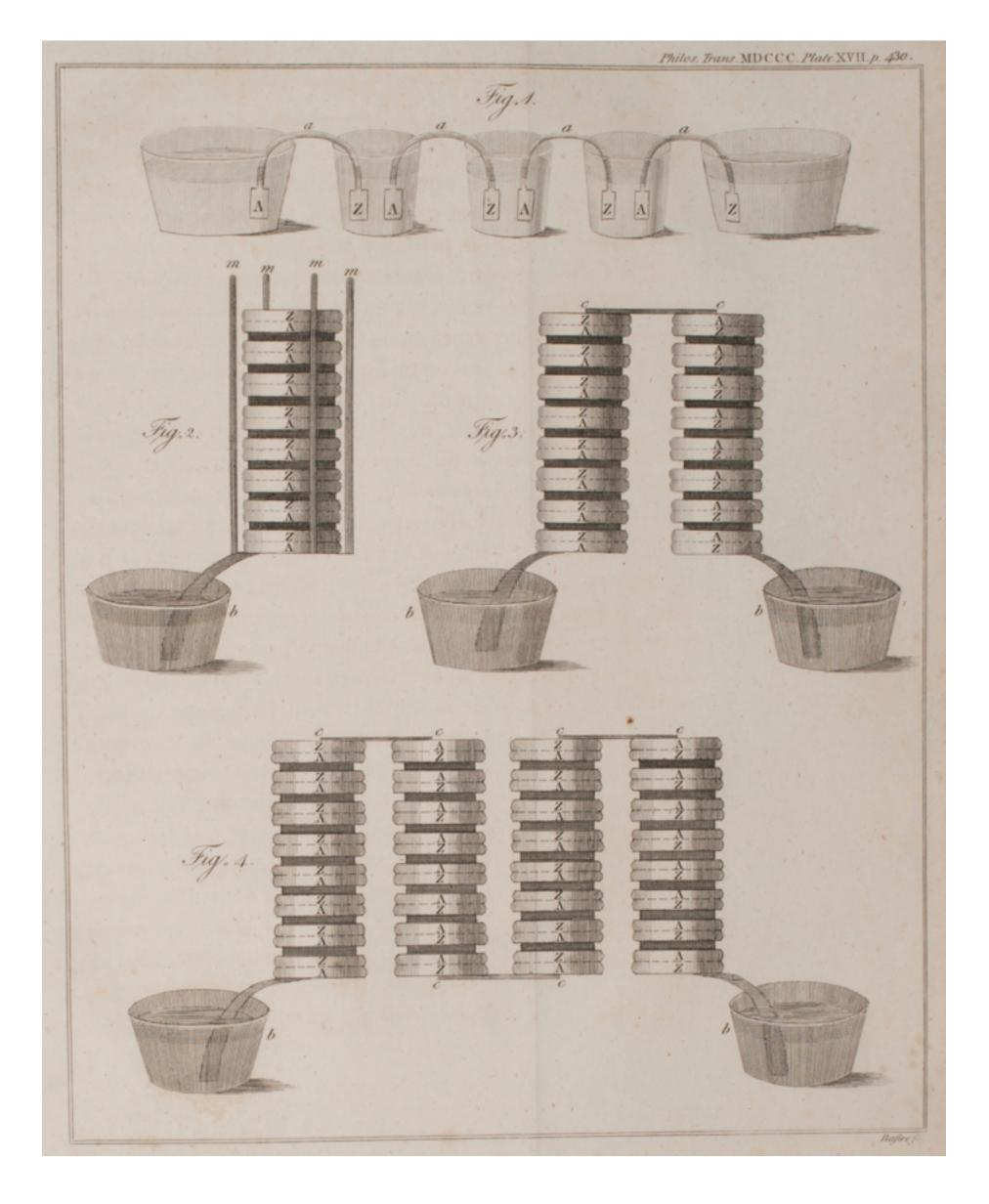




some of them even used this force to demonstrate pretty awkward things (e.g. electrifying frog legs). these experiments later revealed the fact that nerve signals in our every bodies are nothing more then small electric impulses.



italy was the major country for research in the area of electricity – also because the major universities were located there. alessandro volta was the first who introduced a way to store electrical energy and described the concept of VOLTS as the potential of electric energy.



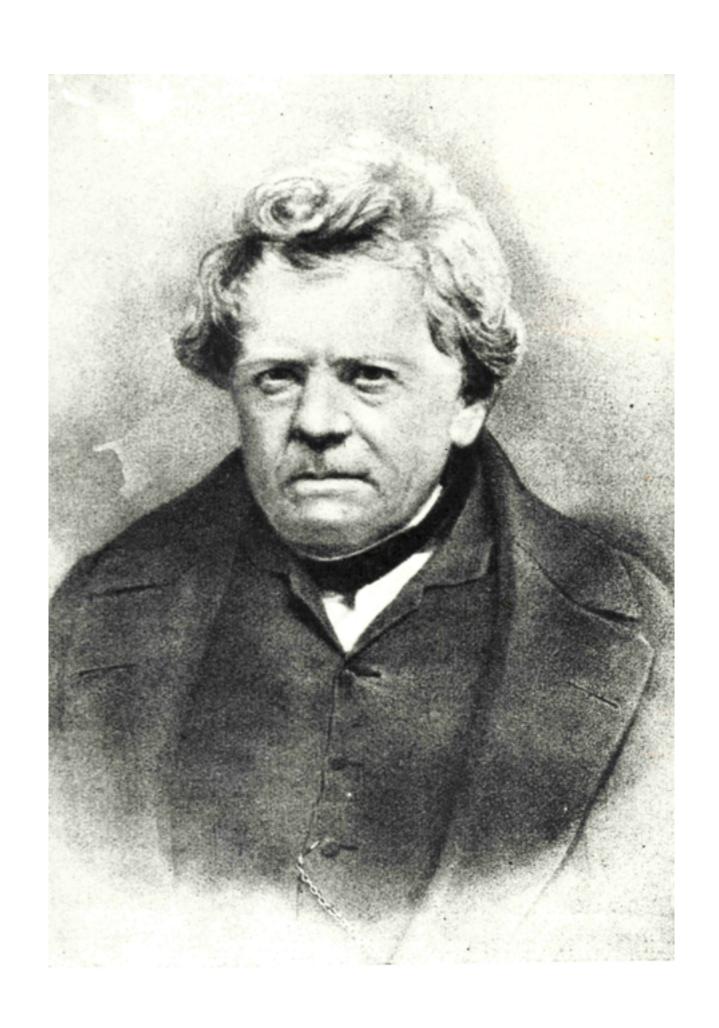
1775 alessandro volta

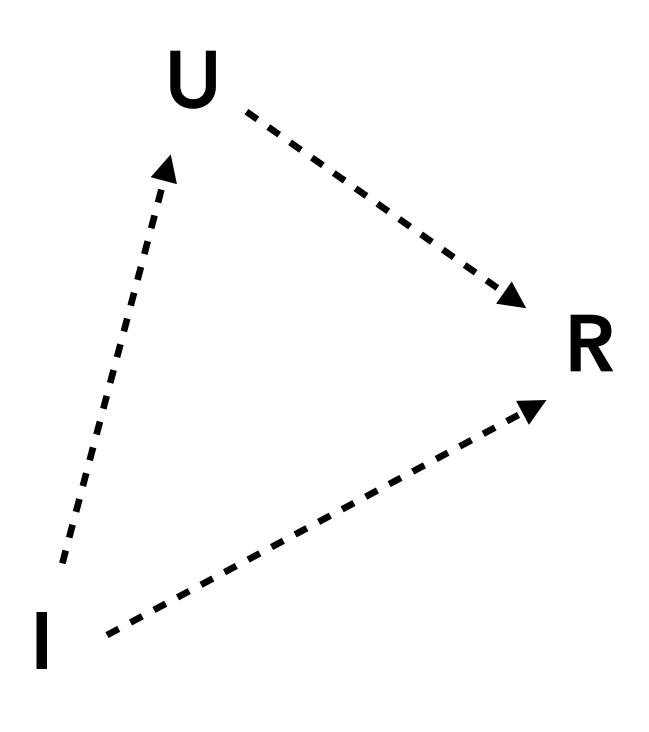
andré marie ampère found out that besides VOLT there is another force which is important when working with electricity. it's the CURRENT which describes the strength of electrical energy.

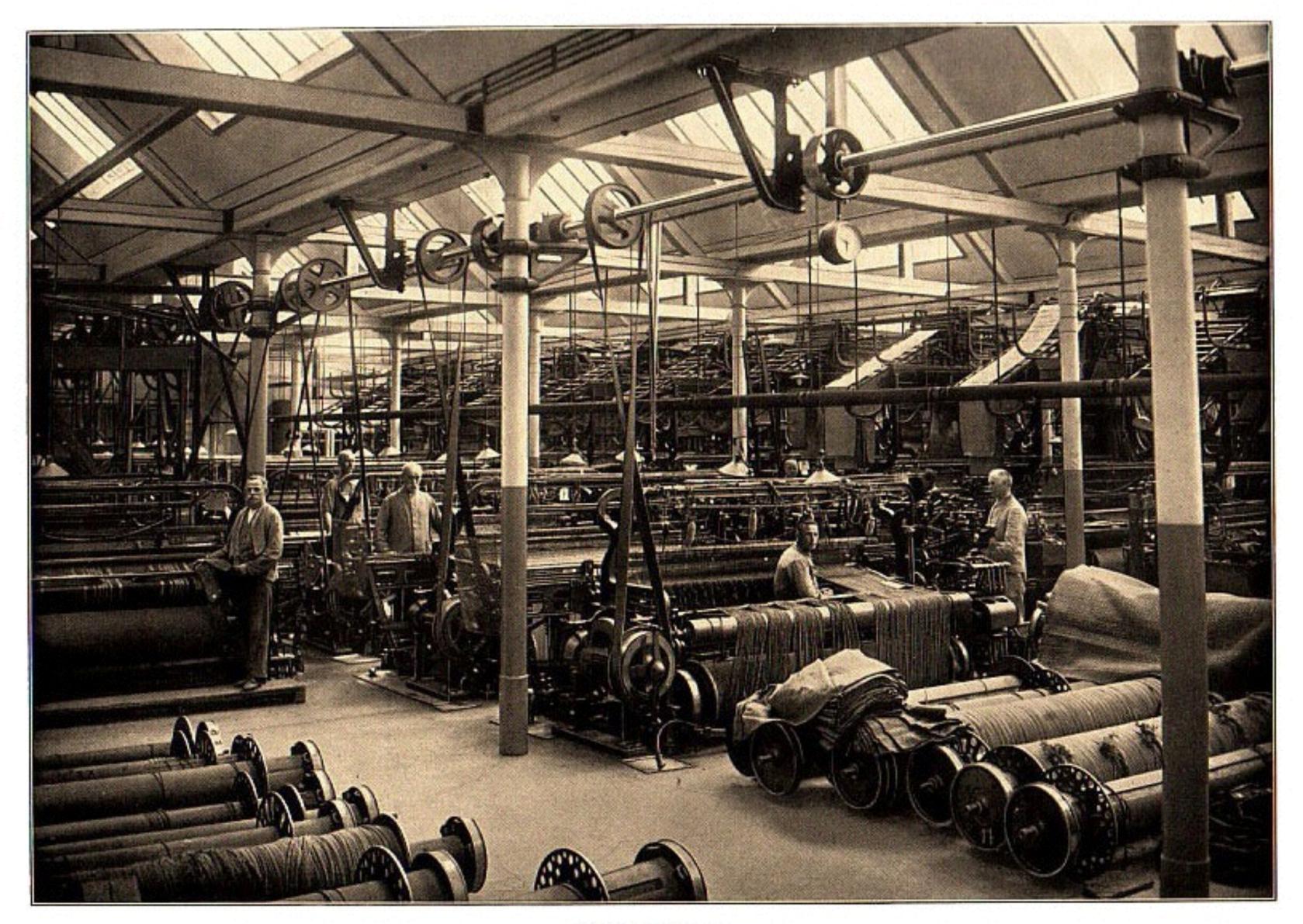


1820 andré marie ampère

finally a nice german guy introduced the last important size for electricity RESISTANCE. he as well described the relation between VOLTS, CURRENT and RESISTANCE



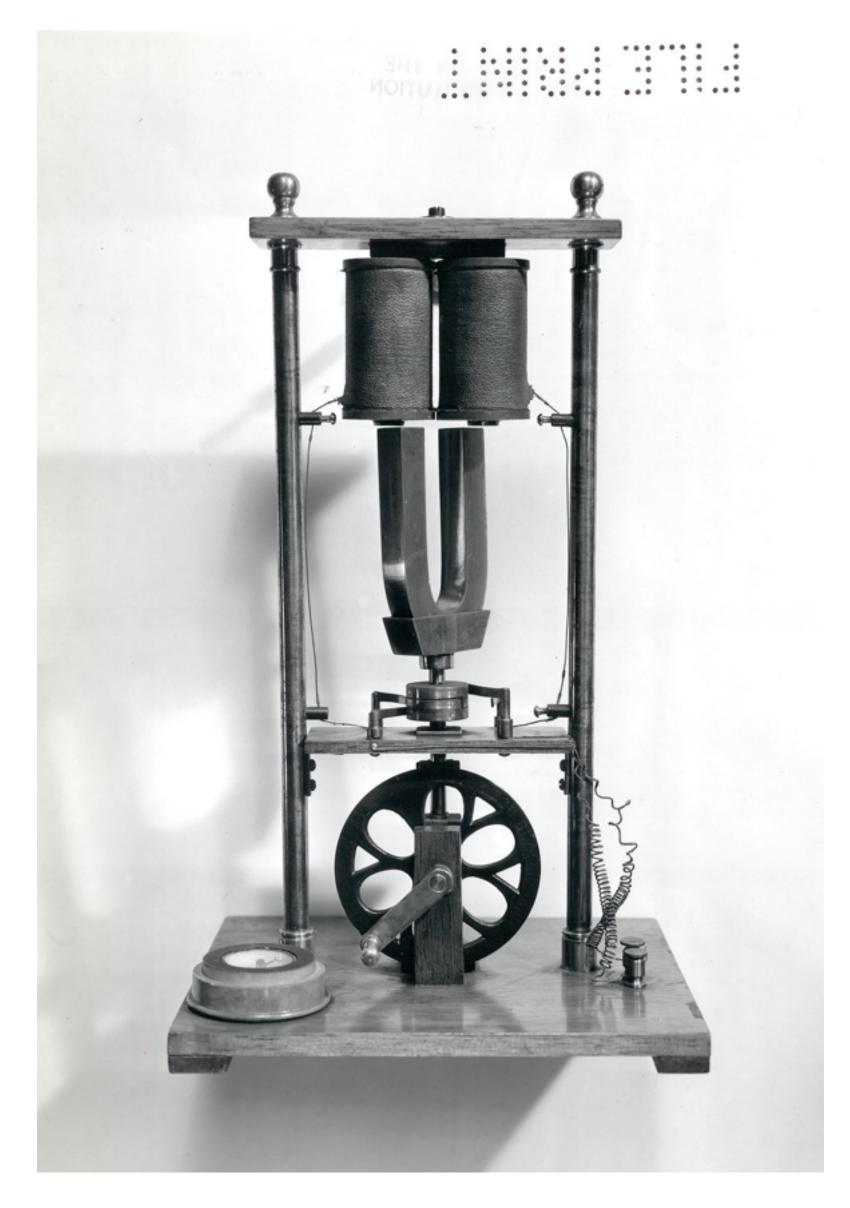




WEBEREI

the first industrialization changed first europe and later the whole world. it started from technology and but had huge impact on economy, the culture of work and especially social live and society.

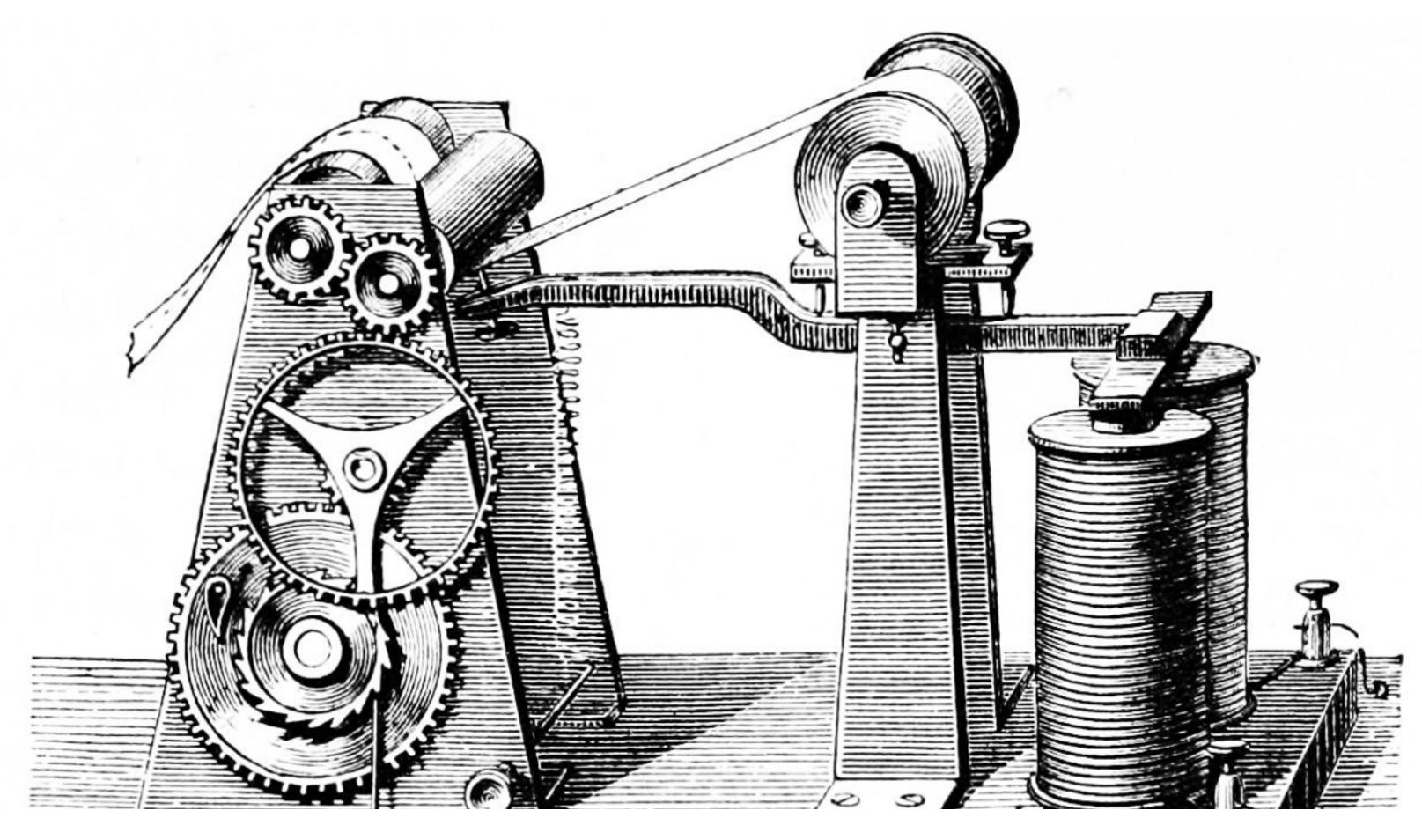
through dedicated tools and machines people were able to finally use the power of electricity wherever and whenever they wanted.



1835 michael farraday hippolyte pixii

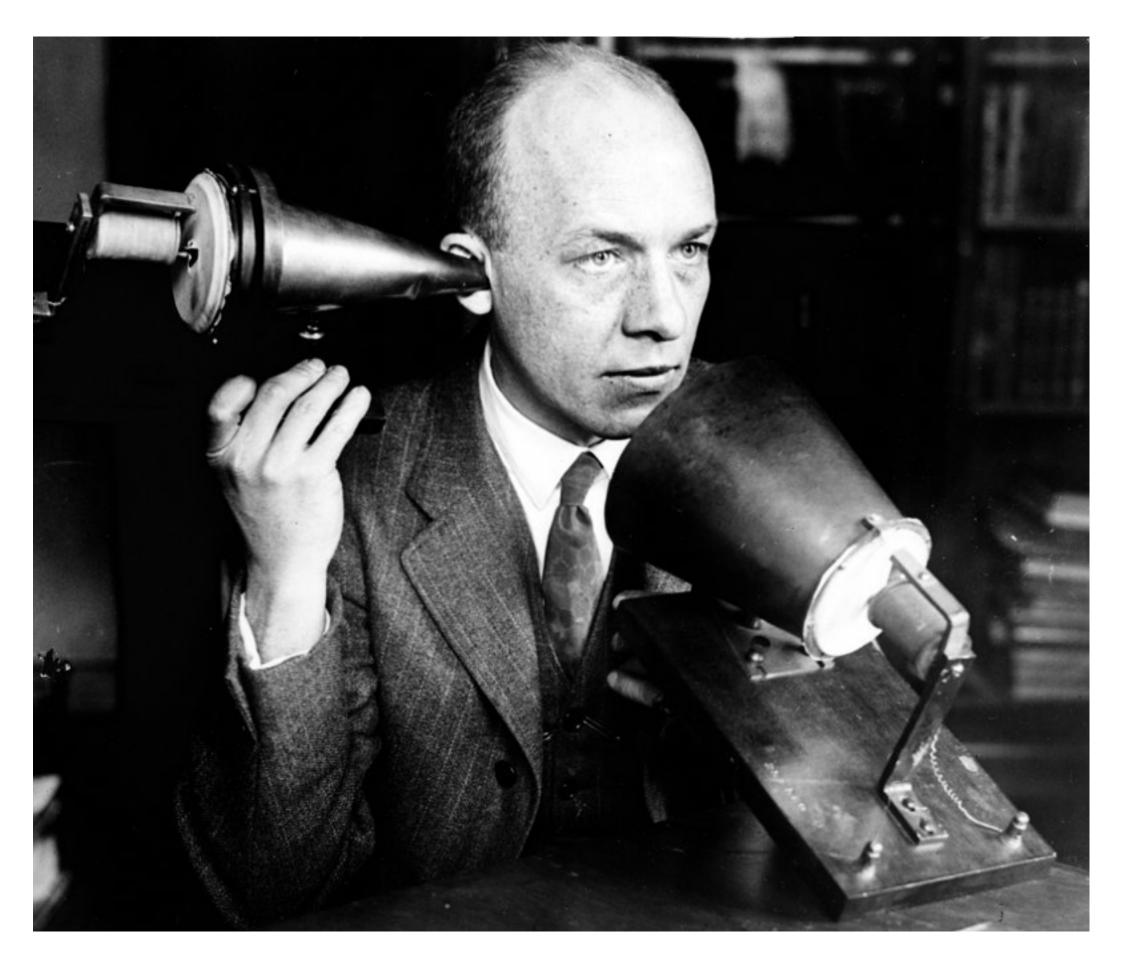
1833 samuel morse

one of the first applications for electrical energy was telecommunications in the way of abstract codes. samuel morse introduced a device which was able to detect finger presses and transmit them through an electrical line.

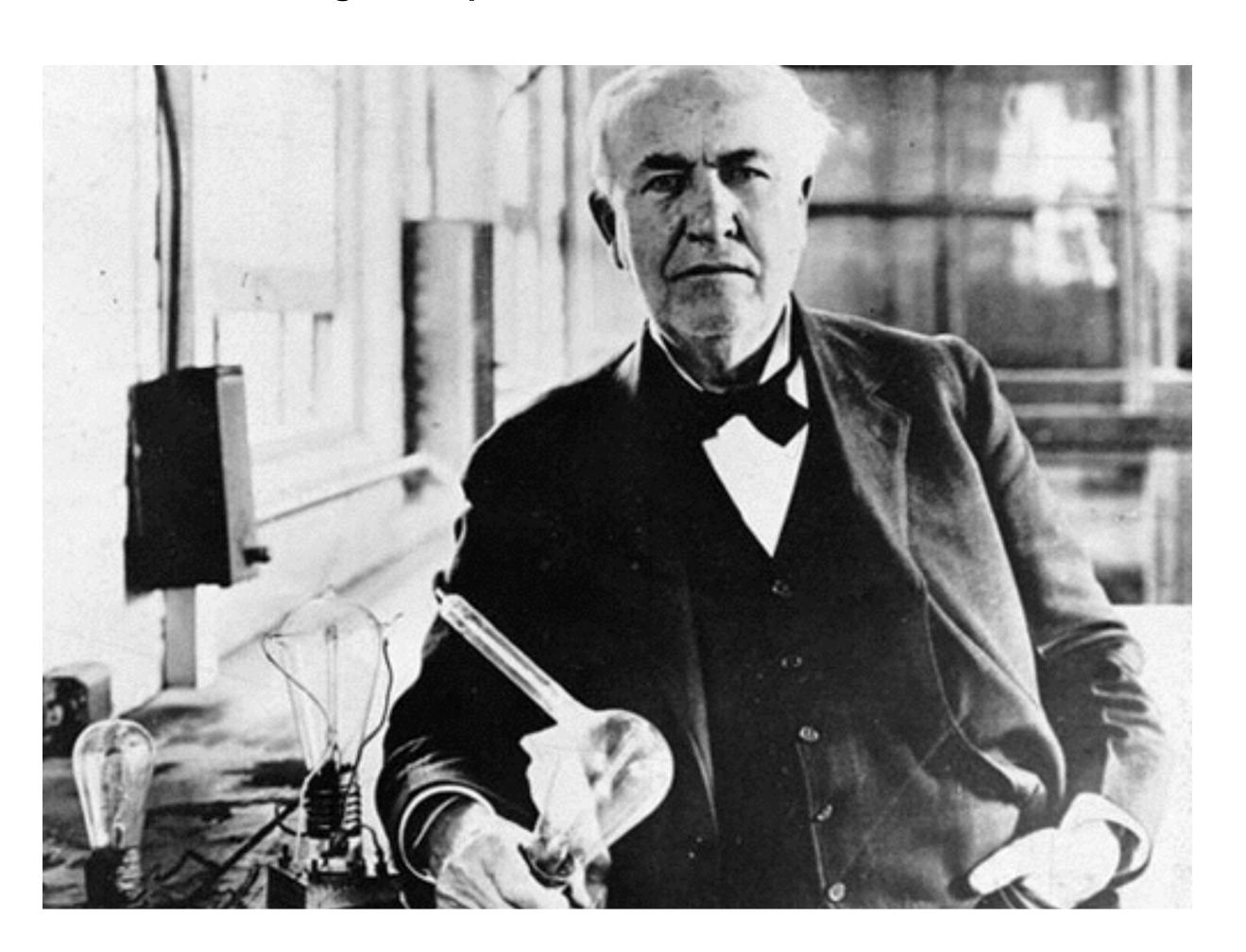


1876 alexander graham bell

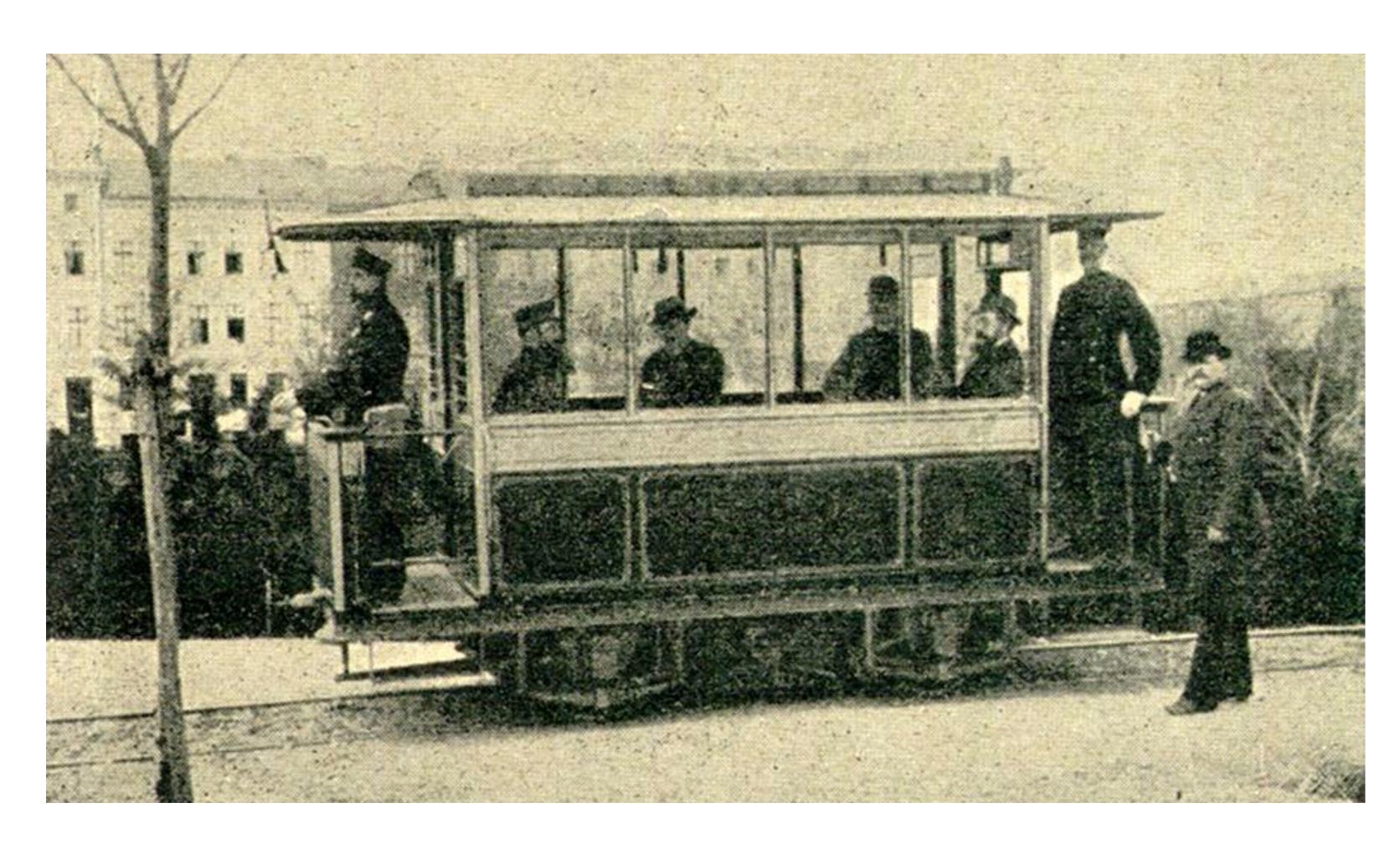
only a few decades later alexander graham bell experimented with telecommunications and introduced a way how human voice could be translated into electrical charge and back to sound waves.



the first 'consumer product' was the electrical lightbulb. it was introduced by thomas edison and solved one of the main problems of these days – massive fires because of gas lamps and candles.



in berlin the first electrified train was introduced to the public. a fact that caused a lot of anxiety in the people of that time. they were afraid that the human body isn't meant to travel so fast.



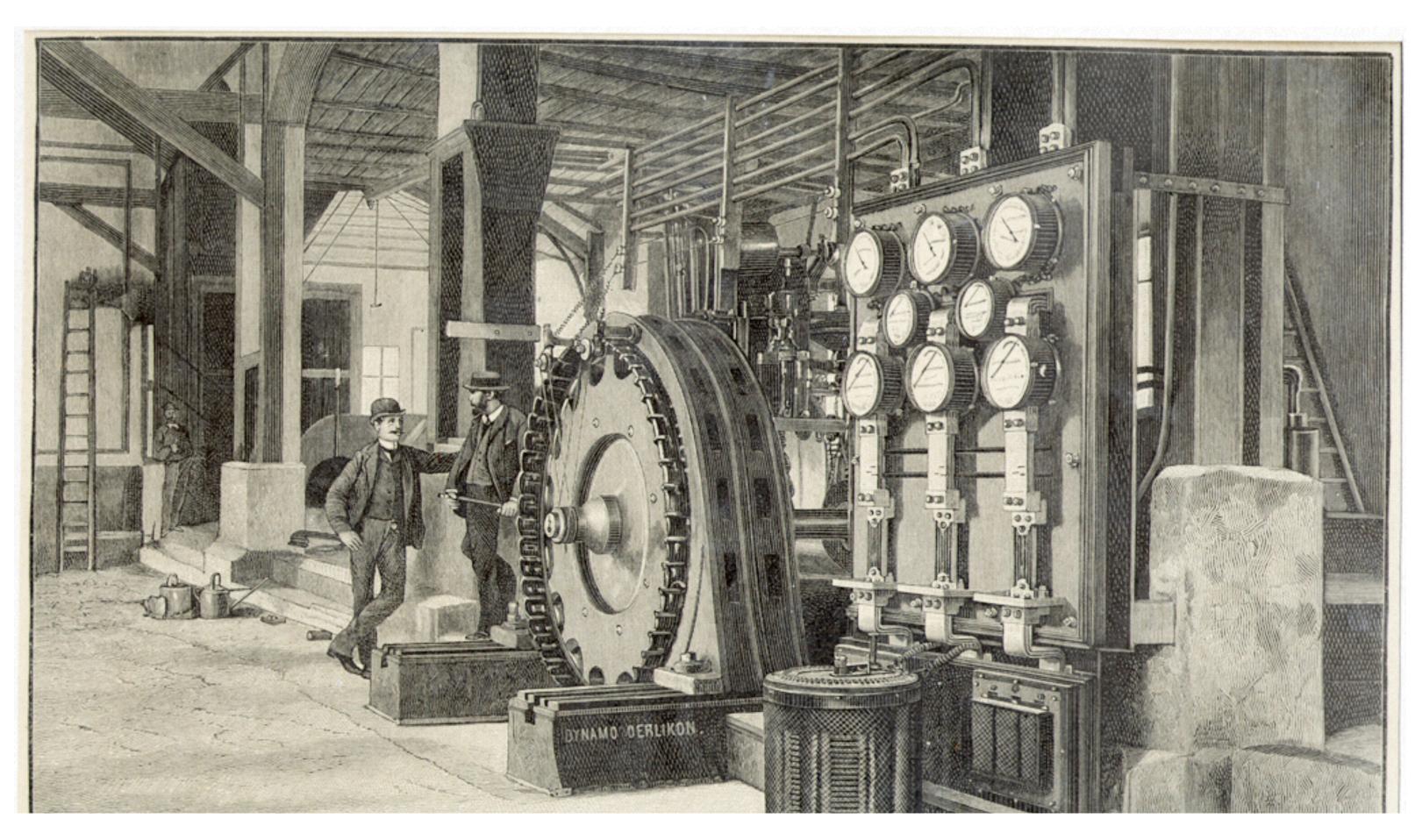
in the late 19th century the so called 'war of currents' was carried out between thomas edison and george westinghouse. this could be seen as the first fight for standardization in the history of electricity.

1888 thomas alva edison george westinghouse

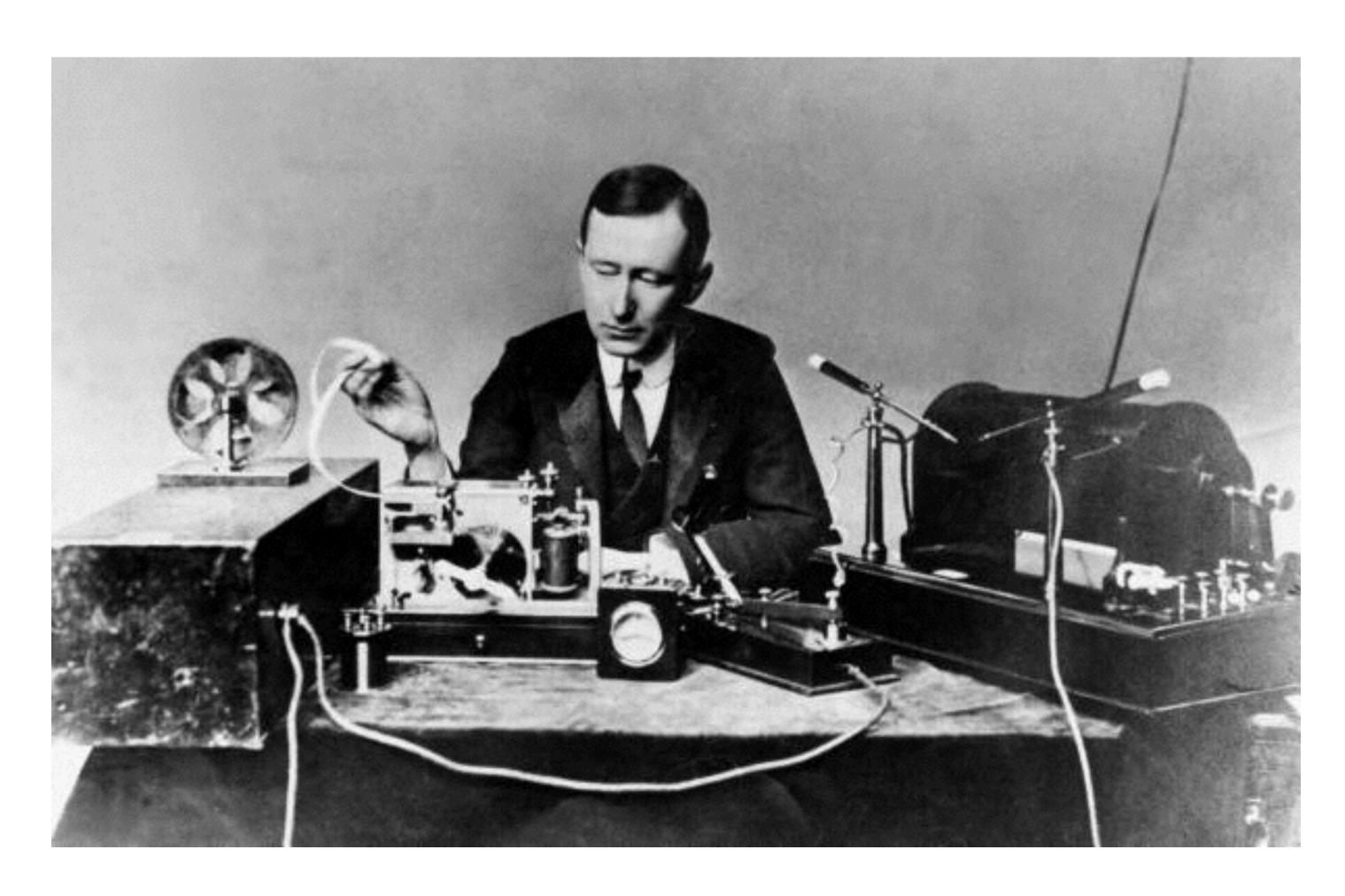
The New-York Times.

THE TOEST STORM THE CITY HAS STEEK KNOWN, STREETEN STORM THE CITY THE WORLD STORM THE CITY HAS STEEK KNOWN, STREETEN STORM THE CITY THE STORM		. ,					PRICE TWO CENTS.
	VOL. XXXVIINO: 11,889.					of size small. These purple who excess I	
	IN A BLIZZARD'S GRASP	women, boys, and girls could not conveniently been wear from their resultings, and most of	York could be so completely isolated from the rest of the world as if Manhoman brised was in	nation theatin Asymptotical, Upon the Nort 2000	valied that gentlemen in the miner of a group of of imprisors anxious to harm when trains second day occur in gail go set. He was compained to my	we have on the most sale tadiots it o'clock in morning were instances enough to get south on the outy throne over their read foring	with contingent of the copy of an electronic and on our con- mone fitting on the copy of an electronic and observed a memory of the copy of the copy of the con- tent of the copy of the c
	THE WORST STORM THE CITY	them total to got to their doctinations for the circulal trains. They dollars do	the modes of the sound sea.	first on a forming point for the marker's recent	Section of the condition of the same of the same same of the same same same same same same same sam	for, for after that hear the top from gates at times were stored, all topyriors being bestfeet of for the irrespont their result for everyment.	lengther store and everybody become green
	HAS STEE KNOWN,	in to any great extent, but an New Torton are	STRANGE SCHOOL IN WALL-STREET AND	could really in a list a year long, they were non-	Harison River into New York sould be someth up- tended on his conductable in companied. About 11 the	Shekathan Company burness confronted in the prediction of parting them up been	Market Police Court, seek 3 wilcom naturalism afternoon. En left his home on Northean are
		any of the treatment summer of yesterday can	There was something almost startling in	were right at hand on the Book Enchange. Dot.	New States, and Statistics, on Springford, 50- acts tived about the tenue late. At boins a decrea in the	dis. The storm had so inscreased in Visioner ting the carry margine, and driffs formed so delle on the tracks, that it terrame a melion of	plerated relived trees on the Chirch overcon- tion, which was excluded at forcestly overthemores.
	MRW-TORK RESPIESS IN A TORNADO OF	maternal purple in the South To state in	The affect of the player on the My Exchanges,	day that had absolutely not one thing of incre-	While the departmentary was resigning by	desking up engines and ruduring the missi of each, heateren, ment of the brains	Quitar's states, in this Stantant and Twenty- Shik steem, where he had his borns inhered to
		the city example operations by 9 s'clock in the marries. Note of them were of no une	transportation companies was unique and un-	of stocks was concerned.	th Italians were reliefly sager to work at above. You using the more from the tracks. The most was the disciplination to got them to get		
		command work named honoraling beautiful with	blocked long before the commercial world in	bull "Moses," reposed in bullrushes outside of	The New York Control had an army shapined pro- teating with the more, but that observe warm the	Charles Southern, nor did it common during a day excepting to two committeed engines in	arguest pur lace read, claried for too office, or if d'alone in the morning and got there at 1, s'election in the alexander.
		to get to their work. Howevy and more stowely	marked to reach the lower and of the bland to-	trans Nurthills, where he speak frontiar: Warbing-	tonin at loan as the show full and the work as black, as it did, as 10 miles as been. The Thorizon toninal properties a tiple provider the	ha Riccip arrespond line was 'to a strating songli- n, no trains being run in etitles direction after	"Congressions me," said a dewestown boot- game man to a Trinte important, as both work from technologic in a serie book at Strongerage
	HART DANCESS. The steem of wind and rain, which began	Notice of the production over among the men.	autopositioner bronsportation facilities. It was	his Assertesa Tariti Club; Gaseya Goold word a	appearance, looking atmost so if figure with the line trace and write give, for at the frequent in special in the line trace of the special line of the line of th	he very andy trains on the Phint-average like the through his circle, leavily below with your	and Twelton-nines, waiting for a flores trian to plove a continuation of paragra. "I started from Engineers to evicent and I have not depre-
	As away over this city and the originarized in	terial such billarates permiss. Notein per	ting to the places where business in	got to his engine too late and found that even the sea of a hundred millionaire couldn't make	white leading which were in contrast to the bi- blackness of the bisher's intention. At the puries bit of the liver lives Contrast authors was moving the	sensed had decompall such a large by 5 years at the Spelker Persons of trains in the line	continued. "In reach the City Hell of East
	progressed. The imperature team to full,	sheet was "bale follow well not" with the	and checks living up town, who were determined to do a day's work, offered fabricus some for	the elevated trains run. Execut man got drwn town, but he state	coupled with storm. No someon would like been the same than the same than a some than the same than a good to be a summer to the same than a good to be a summer to be a good to be a summer to be a good to be a goo	a heavy grades along the opport and of the ad nanomial the operators of brains on the to-	
	'wind because bousteress. Butters daylights	ingestable oid lady whom even the bismark applied keep at house.	state destination. Prices ranged from \$5 to \$40	Farrie annual edited, without having arrests	there of more. Finally would was given that no de- turber anyones would be made to clear the mo-	ede of passempets who test acrementated at the attents and or the trains above forward-right- test on the Third arrange line, buffled in their	to things themselves in france of the current two- treal fination, and source the current increming pre- sengers with a feedbarr of abortic, were not there
	most amorphic and detrimented in the	accepted restarday morning in gatting from his	propried against the storm. It was hard on the	charity of his mail.	The line of the Pennstvania Referred, from an Jureau Chy schols, was baller blacked with more of	hanges to muck their war down hows, con- sited that the bitteard was operated by forces the which their wars not enhancement to cope.	Then want here is both was so the stands. Then want here is paramagns for them to the stand. Mr. They want here is other quarters of the star.
	question that the city has ever witnessed,	his place of business force town was there	receives was present into parties, and its about	age, waited every step of the way from his up-	niment at a manufacili, Colly the early morning at loans resolute the Japan City states deather to	of pastencily worked their wally back house, as assistant on time road of foreacy-alveb, lead, at a worker, and a series of the series of the lead, at a worker in the morning, explaint at	The press they thereon the both part 61s series to be 100. Wall street brakers part 61s and 61s and 61s for a room force, town without a more
	will be go about their daily tasks and wondows.	the signated trains and the rest on feet. The waiting was the quicker of the two, and per-	stad out, because the incomplete power book	was done, and then still true to thes vew of itie,	wasterp points along the read. The drops which he waste being pried up to the force with all day as content to the receipt of factors at most points at	the said and the begons around cleveled from the sair mouse of transportation on the end in. This line kept up a describely service all	that room. Toward the natur suri of the day
	have been accompanied to read about an occur-	plantete wires, dedging falling styres and glass,	As the street care had been shand-ood at the	the one where year, he trudged through more	here efficiely and disciproves. Furnessemble were of an Drugster and stank trains, are spread in at the more person, and the work of elegating off the to	er. In Englan for Parelling Social Protection States of to the Buchain Street, but at about 3 o'clock or morning below Colonel integral language Sandari	named became was broken to been operate to been operate to been by a month. Many contrasts recipied to
	'exploses and had held an embarger on the travel	which Barnon's most spilled gymnaste could	makinghad and delega, to the measure sheller. A	by with his bland July. O'Bries, he salebrated the	of the bitmans.	maked, Bluste command to you at however, on Grand plond to the Statem Story Services.	During the afternoon the receivers of the account through whose the Union jugars over of the Line Lines are a very rest.
	What the presence of a billourd mount was	nonant with buddle onlary. Where the circulal trains were stailed between stations, north	the Part Office contained a functoi-life process	Was S. E. Encodes and other Wall of reed then	The track of the Letting Telled A. M., while the size of the State of	nd often not more than her condition. When the biasts were immpered a little about the little of the control of the little about the little of the little o	primed to now it year appears in right, it was firmen by four houses, who were put on a disting- tion are were from the month from proper by first.
	reased, every horse our and elevated railroad	waps of excepting were consideredly de-	cale were in Indian für for several blocks, and mandwicken between the black-hodded vehicle	district round about eaught they wend morning a louin, but before they were half way to the Rec	road, bindeaded by the snow at that plane. The to	ultempt to ever the Third-proofs tracks, as more terms the day before the law barried that arrange had become to be track to be break.	anneling the every entering to clouds of white on made mids. It had not pround bad a block from easy close, penal before that point was a
	structs were almost impunshin to men	Third about, the skep hands rigged a temperary	nur stages and consent delivery wages a crowde	d standard in midals and had to him coacton to	divine could not the bright truck the year one of the year of	on made a middle before for [trip double to ren upon. It required a good done of siness over the first and this state. Represen-	
		I restricted and he that means the basements	There was great buy when the tiresome trip	Fow more in the Wall-street neighborhood	Seally wearing out the press worth of the rapids of Seally deposits the passengers of Soils Seally deposits of the passengers of Soils Seally deposits of the passengers of Soils Seally deposits of the passengers of Soils Seally deposits on	tend attent and Chothem-spects the secret of formed in hig dothe, prime up on the best because the artists tracks. Two	THE RECORDING PRINCE IN THE BLATTS-
	wires-telegraph and telephone-connecting	It is due to the elevated reads to any the ther was league then the atreet neitroads, and it	offices were reacted. Very little attention we given to bindress matters, as it was pattern?	if yet, The meanings companies had beenly in y passent, of their buys on hand, and that beat	Strains, mutained as servine lighting. Service has blooks converted at Sawara, and a	nations were attended to a can yes of arts and. A good dead of excess would be on want, and the two excess would not for an	Nowhere was the storm ferour than it
	with places cutoffs were brusty at proken;	out human than the rable, readly, not that that I	below for granted that there would be nothin done. The topic of the bour was the store, as	they didn't seed.	yout that edge were exercise, in at the Beryon but, the negative approach to Jessey Copy. Here a particularly of the negative energies became half on most	set when which they like during a rate of the	meeting. We included the best of the best
The state of the s	same rate in during the centre-day; the male	the case. The ice and sport boson over the track	und experiences ofter learning boson. It was	* PROPER THANKS TO GET OUT OF OR	a should a vices, when the west-broad braid was be special from former than one a miles train of building the second trains of building the second trains of building the second trains of building trains of building trains.	not would be dissared at each of those successive scale. A great crums general at the direct- tract ejetion and stong the Streets to see the	arrest through the glood outline and every the enew in hardworth discrete across the districtly and the impression. It builded the statement
The state of the s	product on motion or incometion was stopped.	made it simply impossible for the grips to read the paties, as there was no use in trying. It	one Wall-street man remorbed: "This	Saturday and Monday are the two day	through and narried the desput passengers to a the formy they institute, many of those being it is been being it is	the whom the pulling engines would come to be bandwill to the starte.	policemen and absent term their regin from
The state of the s	wandstill posterlay, and the nonperts are no	adopting this means their measures here on advantage even the horse our fails. Their car-	pa." A softway calman in Wall-sive	Tork Control and Hudson Street, New York	The province bound through furning ventilating trails, impring Jersey city of freit A. R., jumped the Trails, and Japan School in the Trails of Jersey Co.	useing from Origidateset caused in bysever- news to guider there in obstation. A logic	the control of the co
The state of the s	nellapse of all the principal source of Informs	can be used. But the bone care at	choose. The each cost the locky bibler 800 of the parks for Windows Mater. During the may	and Harrivet Saliveals. Solvens 8,000 as 30,000 passengers go out of town on Seconda	in tage one reacts at points in flow-ferror along a me Franchistone Entered, and green money along		
The state of the s	Bry, and the result was a greated expression	prominently wherever their driver and conductors described them. There was a	the commercial boars form town there is not seed because or seed by	The greater peri of this number pe	Then being amping to reach their places of tree	with people that there was to seen for your engine Walting at the opinion's election. Many	trees from Specifys to San-Luck, but tally of these measured where their practical the anchor- ness harrier but remark of the start prompanels.
The state of the s		this that was really delictors. Whenever the	plowed his way all over historical tention	on the blockeded trains between Dobles Fo	Madigals fire engines complete to a line from the sale and to become growings, and were compared to	eritorgie have sents for the up-town role. At \$1 o'clock lead night the Third-Armena line and bases parties steamed, and freing, consisting of	A third girt as far in the little before at the Brackline plot, and after unexpercation temperat- lasty to Brackline, One Printer was temperat that
The state of the s	accomplish what months, if not years, of steps	ant expellent to continue the performance that challes and leaves, they emply unblinks	churchywri. might forumb, It was a gree	tombertable as they could under the circus	enage of one with should wan to represe, under	en engine and one car, wore rea between City Rail and Finety-stock-street at treasurer inter- rain. At the same hour the State arouse purpose	he most get to figure love, as he had important processes there. He said he was a hook during a hard a secretary of the said procured in a spec-
The state of the s	Probably If It had not been for the bitemed the	the horse, mounted them, and not	below the Crip Stall, and it New York had be	during the earlier part of the day-one on the	ned the effectiveness of the breek engage system in the contract greater in the contract greater in the french line. But of the French place Redirect.	some only proming marine areas upon the business by	some first first to take pointrings that the property to the personnel to execute on the
The state of the s	indefinite time enduring the traingues of electric	The trustmen and even the drivers of sapen	appearance then they did. The belifug or for	the other on the New-York Control. The same	dies per Auguster Democratics, Mrt. 1982, A. M. Francescope, Compared Democratic Color of United P. M. Dan Printer of Auguste, and Recording to the Color of the	When people begin to their there was no force town people of mercing there was no early thing or a confect road to operation to the	Country to be because which properly over the
The state of the s	abug on translevers, and stower care drawn	town descript tracks and wagers are to be seen. The fact was the entring wind and the elliptic	eridences of an ovacuation. Telegraph wil	The Tremand is a radius of some 10 miles. It was significant that the supersimile we	me justice at 2 100 A. M., was noted out to be time. One me tour side a half ware consumed to reaching dispare, when, swind to the surran, are luvines	was these sources and a real of the second at	reached the models of the torogo and, had in ord- been for the policement who bearings to see
The state of the s	with their contro browns ratio. New, two thins	" are and thought only of finding a warm spot.	half buried in snowerths, were complete	the barbar, the Total and the same the most off a tree on Three presid services who had not off a tree on the tree of the the tree	on Principles, An Armenya was need to pear of	a visce all use surface imple were two feat under the spow on the larm and prevented by delite to	York alley. As It was he was testly free block, the time above of more properties up the work.
The state of the s	ly rapid trunch which cannot be made inspe-	and even a bilimed threw memor hate on	Old Triving was a signific as artist, and	er chains and the control of the control of the control of the chains. When their trols actived the chain their trols are control of the cont	the absorption is note total and a forward. By masses of two species foreign studies forwards	since the way the descript street our standing in the modils of the treet unti-	spined. He was the only man recorded as herving times from being, on the beginning. See 50 bridges times from the best being the best best being the best best best being the best best best best best best best bes
The state of the s	and as speedily as produce reading too, and the	Those sparty reason a harvest. Gentlemen wi	with fastacle formation. Hage drifts all	or the more. The care of the trains we observed with passengure, name of whom we are considered with their district.	the nation between here and Published and	headway against the combined forces of him- positions which and driving more. New and tions a speculative driver missions become seen.	Early to risk the being the bridge to the total the total to the total to the total
Service where the service wher		and you there have his newer-house outs or	trings from view, and now and then con v	others were brying to make themselves be on deptation as possible to singing sough said orner to the robust in one thing all the parameters, it	tight from the Pennsylvania officials. This hadine was preved part the highest office has	with may everywhite may replace, from a business's next he a windown, went being-mustry buts the business of transporting presentative at a souls of	areald and he dame manifesterity, and above to states the engines were used to push the trains, which derive the rest of the day too, 2000pt
Service where the service wher	ground without any delay.	need her was \$10 from the Heffman Record	back. These persons who were competed	to philippin and the students between anterprets and that was honger ferrance anterprets to the supplementation same arrows with	of come and further notice. So trains were as come and come and further notice. So traine were as come of the maintenance of the section of the common of th	him which would ordinably be exceledant, but which was justly figure for purceries at mo- uning the parecepts doubt pay. But this key try	bounded were experienced to training over of presentation to the contract to t
Service where the service wher	wines are not only useds so-less by a same	or opposed to a most incredition speci, but it w	toriable wrape for protection, repark	tendents of intelligence conditions, and the delingation was intelligence of their facilities was quarter of a followingstone.	any will be today other the heavy drobe of show before an her and Philadelphia and he cleared asks. The hunty to Juray Citi has at	Was bury immilate, unconficustor, and teather uni, and near ramitted with all piles sufface convergences before the victorium blinders. All	the freezing, when the street is not treet was remote walling to be exceeded to freezing was remote made seems. It was too more photographs or and
Simple control of control in cont	In stable to be purious durkness and the sees	stance liverymes refused area, these extents	that there were many gentlemen for	The By S o'clock in the effectant the total to trai fination and its viscolity, which is measily by [55] of activity, presented a more disease.		moon a few advancing backs could be note to Broadway, and these wate the enty whereas unbutes in merica in the city after that here.	on to beneficial private Plan. Startin, bandley- couple of the choice Plan. Startin, bandley- churks, national Part cape, and year, seeily
wheter the control of	Bagrations through the failure of the fire also	on always of a cultures biscould reducing.	Artistocratic buckled, on leggion or tool toward under of their panisheese with cools. It	the memoritor appearance. The reserves, who the their and the year immediately extends, who the theirs of shape and the designer of being	No attempt whenever we made postering to move imight ever the Course Suitment of Fore- ing Surger. The management estimately foreign.	particulated of the Shape and Princeton for charge, and Brancas from Startes En. 18 and Trents Sta. 5 were bogg for four brown posterous gravities	the monty their man, who might have been a terrior, and overside his send with a treas.
The control of the co	To the great majority of musicipal and m	transaction of business was parallelled. Yest	pictories and instructional retries eventures	ton Cloud day who togeth, where an elect of the period on a Cloud of some whole styles the transfer of the period of the transfer of the trans		Birth-wance brank, from Bisselber to Station over a street, by incident taken from the station	the trialing out from order his had by the most control way. Desgle were lively being
the parties of the control of the co	surprise party of the worst hind. It began so	on It is assistant to say that the "spening	belowing men that up their fact in wrapp	end comming them with white patts and giving the	magain coming believed servey City ped to Elizabeth and Burway. Early in the flar,	ber of parsons accious to their on become	on reaching the plantures storm, they fromit themselves in the model of a good managed grave themselves in the model of a good managed graves
stands and the second control was within the tensor of the control was and the second control was and	personners - elliers, seperture, event	of the storm where many cherts are a	- done down town in sage with the lage, and unfortunate man without some severing for	the auditor in the great directors save that of the money of the wind.	de deverte de estare de la render il tammempir de pui la ren la render de deverte de la render de deserta de trans.	appeared with ladders. They worked in pure- old going to the top of the lainter putting a for and cooling the uppeared down, and the other	out for your Valurations," and cheering as each time patient one for Sanation period for the patient of the state of the s
stands and the support of the control of the contro	Store, presumen, no well as the news to	the least, if there had been sayrining to do. The	passersity utilized for this purpose, sepect	saily until written, while with ware antilines in got in to thair surrection brokes, clears with wark by	ment over from Star Jurk. The story had to	heading the fact of the lattice. The he observed from 10 to 10 course and our unit begans that on any lattice are been than an arm of the course of the cour	Chief the storm was bond in Nove-Code, and wave front surgetime, and chearement when the formed the storm ingitized in Secretary, and the
stands and the support of the control of the contro	hardest morning realisting that an uncer-	at help. Pastories also did vege titale nome	Few of the portors of the big buildings it	the Union States are the Section and Section agents the Section Sectio	the to make anywhich hear establish time, and fingli- in (p. 44 4 50 P. M., the entities train services of the	At Sullyan and Third eyests many passes goes left use of the stalled trains and went to	sarrabed road shot firsts. Many of the people retarrant to Mrw-Turk to special the sides as more brists.
stands and the support of the control of the contro	mad industry. The sufficiency, in fact, were in ma-	My I store matches hant an well have been, which will I	un ever in clearing away the mow, and an a	the time, and performed were strategically of the distance which they seem and the strategic of the distance o	the through them went set on time in the transfer in the through the through the through trajes	the street by tablers, but not of them, in an amounts, to walk back to Streeter-street tall late Tabel otreet. He moded in a secretari	The dischart management on colors of the financial of the factors contrare at the Bestell to rose regularly. Decing the morning short of
stands and the support of the control of the contro	account of the non-arrival of the train	the metapracie, and the inpur saluess. They we	per New, and Scool streets. The status of W	half- of house paids which a worder price, and of an analytic price which would along Forest-more	Som any point came in during the day, The years along the time years forwar early in the case of the c	To him who had no special warry or flair,	y the Saddery man after 8 o'clock, After the Nagradest resolut her Success stip, phone 25
stands and the second control was within the tensor of the control was and the second control was and	the between furbal to come would with the me	TWO I I IN MARKED VALUE IN THE AUTHOR HARME, PRESENTAL	the the father of Ma country might have be when he imment the Delaware if he had	and some that had being us, the roots of the hos and light the street, in addition, to the property	see lust night whether the trains and tight to all reacted dust designations. Toward sign, to all herylocate fermed is assessed difficult to make	that mount the righted eightes. Of course the deline is the streets and topics all the en-	the many described of assessed to op would be come figures of the day. Inc., is not a clean of the day.
stands and the second control was within the tensor of the control was and the second control was and	the of the that wanty the most, and probe thousands of four Verkers restoring mounts	The case by manua of the favior made	There were only 10 of the 1,100 member	u of Parisatrigan would their way with soften through the deep norw, and is placed where	the complete over from the commence After the commence of the	down trees was in married for the covering to common trainment. Cost of Time Preserve and wa-	greated in the stating more. At 4 o'cone the Kurtishad clarkes for the mann! It was support at that the month he twose at them, there are
stands and the second control was within the tensor of the control was and the second control was and	'quad, stendy, chrockgoing break of failed	their minds to "left well enough nime." I	of standard art ich o'elock, und a hange majoriti	y of covered with a transferror conting of lot I made walking not only difficult told dangers.	had reached the bridge. He boat was sent our from the law York and after a 60 of such a sent and the flow York and after a 60 of such and the se	Several months and Evel-seven. A supply about to a bundred imparises the	to long to maximum the trip as usual. The board which comes up in the marriang all had been some years about about about
stands and the second control was within the tensor of the control was and the second control was and	Their had bettered radio, and their frequent	made the board lively last evenjus, and re-		mair our lain agen, and several evidently were to low low that they were noticed, after getting up to low loadings their with a bailegin long. N	the school begins would be sent across carrie the strength of	were there. Home of the company had been worthed for three house or pure, and not you had been been within the contract to the company time. They walled	The new heavy to broath threathing our nach of the time beaute two record large and their surgers. The class was decreased too ayest by big in 186.
below the contract of the cont	sectionally questions whether lots was worth. had when not, with all those brings and torbe	Dr. These octorion visitors were mostly foreign	the bound like a descript between they a	tingle and could be seen attended to come to the barriers of the seen to carry the 4 deeps blocks.	pay the Solvin and Hann Lovanou are completely thousand the state of t	put another neur, and soll chart was not brain. Two or three becommitted and present durit is a singular media, builting theston, that are	The South Forty and the bear ind to be! They way institutely, and the bear ind to be! They are the best to way with group onto. They had few inside it
below the contract of the cont	The other comic loannels have made lots	of the tenior, unclasive fewer than here ever o	one Coat of the 20-or 40 backs which do been	area. General Superintended Venery of the N	by Chap such from Received, Section Section of the character for trains of the character for trains of the character for trains at a right of the for	the tracks were beautiful with the energy and to engines your and fail the a skip on a sea or the stagment impring ever the tracket. The ter-	Through the dults. Trucks were described all gives the closest near the forms. At the Publish gives the closest near the forms.
below the contract of the cont	halteness by Dennity, Venturies, on the Wa	old. While the estudies of the restantor	east three warn tomplied with officers que	mine I do. We sharted our special shall be to	The Bragations and the country for the country and all country of the last to improve the provide produced to a communication of the country	on the triples it refused in he creates wide, and smaller when proving ever it com-	at identicals of 10 or 15 minorian. The Wall- distance of the control of 15 minorial beach and all the Part mentions and seem of the
their some there were the property and most to their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the	the furnishmen, the States Introduct, and a	mail, the ambients of a more service to	ture mores, Handsoffers, and Smilt of North Aces	notes. We do not know now where she is. When it	one in News the trade only see as for se the News and Yout and Suspendence State or country, or that	antiquate. The steparat real ormoner de nationality. The steparat real ormoner de national ferom one thing lies a track precision	The Service Street Farry ran pretty regularly,
their some there were the property and most to their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the	Name to Avendria, and they began to reacted to	The Committee being taken. Into shows for respect	tion. Mantison to the sides were infestion. A	s the time doe is blocked all above to her More adjust. Each near the city the during being the ball hard and more on the tracks, while	department After this pinnings, all efforts to get the update out, when absorbered, and profite this time of the profite that	second and delicate to send it not said to storm. One beary broomapparatics would have	of 30 minutes at event. One boat did not have to the elle test it is come accree. All the North Breez better, stoops the Programmikeshee, w
their some there were the property and most to their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the	As easily as I o'clock the sore had get a li-	with business of tree in this site war short	manchedly unders to attempt to continue	best on the court of the second of the court	the Suppli leave Endpoint nout the stores reason. The Codess was store the finish appeals on here, the	But an once there was a legisl gradiental will wanted to away a brighten for a house, so you	Military Policy Typerwilliam
their some there were the property and most to their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the	was simply married to The Wind seems	4 to be not seen in estimate the perceiver into	terminates have been without contribut courts	we have provided and in the norther total or also marked and the statement of the statement	the Tuning larger obtain. So through busine come in the Tuning larger train to the city on the Sorthern.	persons of in the corrected without more for it hards and a load of the correction o	IN AND OUT OF TOWN COMMUNICATION
their some there were the property and most to their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the	rate, direct propelling from it	had becomen on the Endanger means the h	es of day and further business should be usuin	of the Communication believes in Francisco and the Communication of the	that Districted of North-Japany was brooking by a stated- ness on the wast often at Sprager 2010, and the ness passengers were companied to want abrest for	There was a bit of patter is one of the source of the store of the fermion excess stores section. As of	Destruction most complete was wrought
their some there were the property and most to their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the	decrease and pecking it up against the di-	diag manufactures means the loss of many	Nothing like this ever bapposed in Wall-	direct Reports high classing in their a done to ward beyond in 6 and 30 test of doll.	takes better to the Roys Decty. Next of these took then loss by the formioning and regarded from in some of the down-town become.	where a train was price long steps and, patter when a a train was pring, better late town win site instead that pattern layer even whether	in hoth within and without the city. Pulse, with
their some there were the property and most to their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the	It up in high driffs at street corners, of 140 it look hard mounts around streeted 160	treat transportation by an and land. How it	day's of the great dissisting in 1881, when the	neit adiany as sweet presently mer and reached Nath Torig at 10 woods, from h	the Rest desired analysis of regress pro- curs forward and revises; or support was brief for a 1th law desirated serve best code. The supporter	hughand, an old team, and table, was very si-	was wregarded and twinted toronthesity by the wind. Need fixtures, with their tangled thousand
their some there were the property and most their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the	" near before. For the first time in their	lives poor femilies will have to serioup and	sare business was daincred but not ourpended.	The partial the read in a narried ampliture, we been have wind blowing the floor man of the floor and	on a spatial to the Green. The Japanese wree- ners of and continue for a train. The Japanese wree- mers of and continued that it was again as restricted one in	and the would present in Thirteen-aton and then dring man was realing employed in a	of twinter and tentes words, but he to the wind,
their some there were the property and most their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the	Not that the wind was at all controls	arter more and one. And the actual customs to	changes was similar to that on the Stori	En Proposation and Allenty the passes for the Proposation and Allenty the passes and the Proposation operate heat the St. I	seast season. It is unit to may that they did not ap-	they their property to the title that the title and the title and their property to the title that the title to the title the title the title title the title titl	At the Western United Uningraph Subding re-
their some there were the property and most their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the	and others aread. Not allows before common Choice Charles	closed I harmonic would and constrai desciption to	orbid where the opining the corporate grant is	reand express were bring to make the program or the few forms the Personal forms for the Personal for the Personal forms for the Personal for the Personal forms for the Personal forms for the Personal for the Personal for the Personal forms for the Personal forms for the Personal forms for the Personal for the Personal forms for the Personal forms for the Personal for	- NO MEANS OF TRAVEL.	ing an one one to span, she had brodged a b- duces blooms through the sort in the abrupt storms to regard them as quickly as process	feeling. "The deathers there are not down," and P. W. Battletin, the wire shief of the operat-
their some there were the property and most their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the some their some their some their some their some their some the	nece, if the haplest pedestries trees t	first be reach form town in the morning	wins to Chicago was in working order. The	d, but Charrie Station that have place at the Co. Charries Station that cannot find a gar-	Aimest every one who works or does	And now, no train. The etd woman burst is been said to har feetingens placest trapping or to the from, but assumment for the environment	business weren, inking it expect to driep. The
their some the common to the commo	thing he know an eights great took him, wi	in a crete find other constant for the shifts.	b was from Brooklyn. The oil market element	ware dayed eigh best to compact the track twice and off a to be included soot facer that engine become	that bearing to New York Dres up town or out of These town; consequently there are always constant The	this shared on lightly an could be over her con- aboutton, and, her twen unclassion, here	Turbington we have sufficed took accordy. Fully 100 point are down there, and indexes
their some the common to the commo	does of about that brinded him and good sand him as of that he deler's know any	coldy wall they did; for saything more casedles using: the streets cannot well be conceived. The	then point, but transactions were light.	their to retain without having accomplished	solve bestiese pers of the city from all directions dur-	and idealing most fluctuae. Down Stationers toward Direction store fluctuae and increased and the	as latervals of every half mile. On the radi-
their some the common to the commo	compounty discouraged.	there In bushing back at the events of peet	the regular force. Collector Magons of the office in a cab, noon after the name	Annual Ma. Toward remained asserty the critics of hours. his office, amonthing construct. He must make	ay in there are similar streams proving out to the same again. Probably half a million of people pair		The East-Tork Course and the Name
	todays rather busped the fluxuring dated	the tip of the most amount of the tip of the residence of	of this porting for duty. Owing to the impaired	Acres tationers in the neighborhood to expert the	part position the signature rough, the studiests come of the studiest co	good. One man who and month waiting out in	out had the private their name been had now at the day with the private their had to them quarters the of a main. May a read section of the same and
	handle them, came to the conclusion before	That presid blomph of civilization, yo	of the an lower and a quarter, All were reports	of its all mines he required out with a large engine to down on could not down his way included and of	next of branches and trief bronch. Our complete seems to be provided the schools of all thoses provided the school of the complete schools are supplied to the schools of the school of the schools of th	money in his pecces and them to pay it, time tights. All meatines of tiroubin he saw about to	up caped having some price force, and at 1:48 and the company take operating only fire who are in the case that the case the case which
	Farms but the nath on the head when he	sang emphase and sistement have end	model were not opened signif personal, and the d. dis-	vices by accompleted a base drift of nor face high, and this he was under he pen-	manage in which they should be hithe to imped w 12 the samps of their labour. It seemed important white and sectors savings a question, to speed of them	The partied pushing are then. The partied pushingers on the only train wh	the to Reston. The worst of the enem tame to be to be to be to be the second to the track of the second to be to b
	conducted that three tree, Their	there is been the element of the	name . Some of the Wall others man who got	tion. after imposed afters. Finally to recent down the eighte. A number of insign working has played their services to opening any	who comming busine, but it was not been an entired at game in a comming busine, but it was not been an entired at game its quantum on to the pasting of returning in	parariag had their light for as well as a leading the true people. When the truit marked the Two	ther not much accompon was paid to it; but at 7 per or open or Member which we get wint that it is in the dealers to be and changed from more to come, and we began
	of business did not see them pret-	ering. then. Belook the fury of the great bilioner	an or The accident on the first, the phenomena spines report of the New-York and New-Engles	lip back any backages disappeared with these, and any d Rail: the spinion that they were of no use who	named hardest discreted Orable and mortion cars. The	those holds that there was sauther been upare. Exvertinenes the "cots" made a feet also after to get in, and they were secure	nor sight we were not of from Vanishmen and the Rabinson completely, and at 11, events yet
	houge, and Young Vinerica, buyer and girls.	Diely the pringing the electric light	wires, read's earnings, the declaration of bitter	their size and the handy any work. Arthur A ring to the office of Supercounters D	brains. It may believe the efficient of the st- brain, clusy with a long name to know that " Speake,"	the traductor who relied, "many chose," of top of their torons. At legt up brinkerses in of the case—to one but an brinkerse would be	one in the condition of gazant ages, whose where are
The explanation for the property of the proper	and interesting induces as their great at	Then exercise, they became dangeroom.	were and his striking tocomotive engineers, built soons of color similarly deposed up			of new rappets princip of trape between an array.	made, occupants with traping against those still up
	The wifelanding the clay at house or was sufficiently fively. Some thousands a	Carry, standard country that he even use the	New Langemond upon hy many among the be-	er one Conjuments Little Marris Pills, 18 mails,—a	the I still of favor adjusted with invasions different	I I AGES IN MANUFACT, PINE IS DIS, THE STREET, - B.	

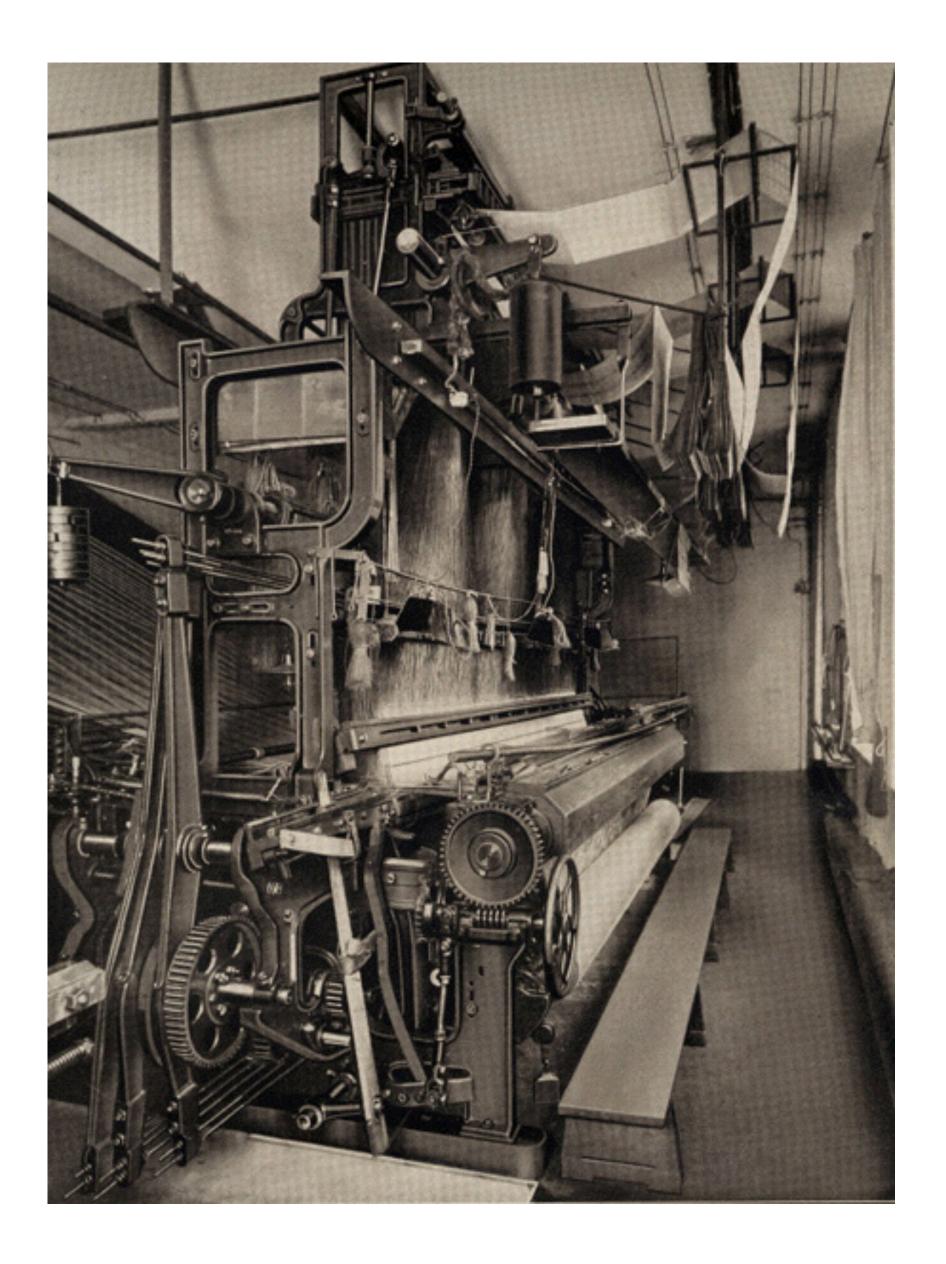
in oerlikon a company was producing very early power plants and generators which were also used for trains. later the 'maschinenfabrik oerlikon' was transformed into todays still existing abb.



a very smart italian guy was at this time already experimenting with wireless communications. a technology which should later become very useful especially in military applications.



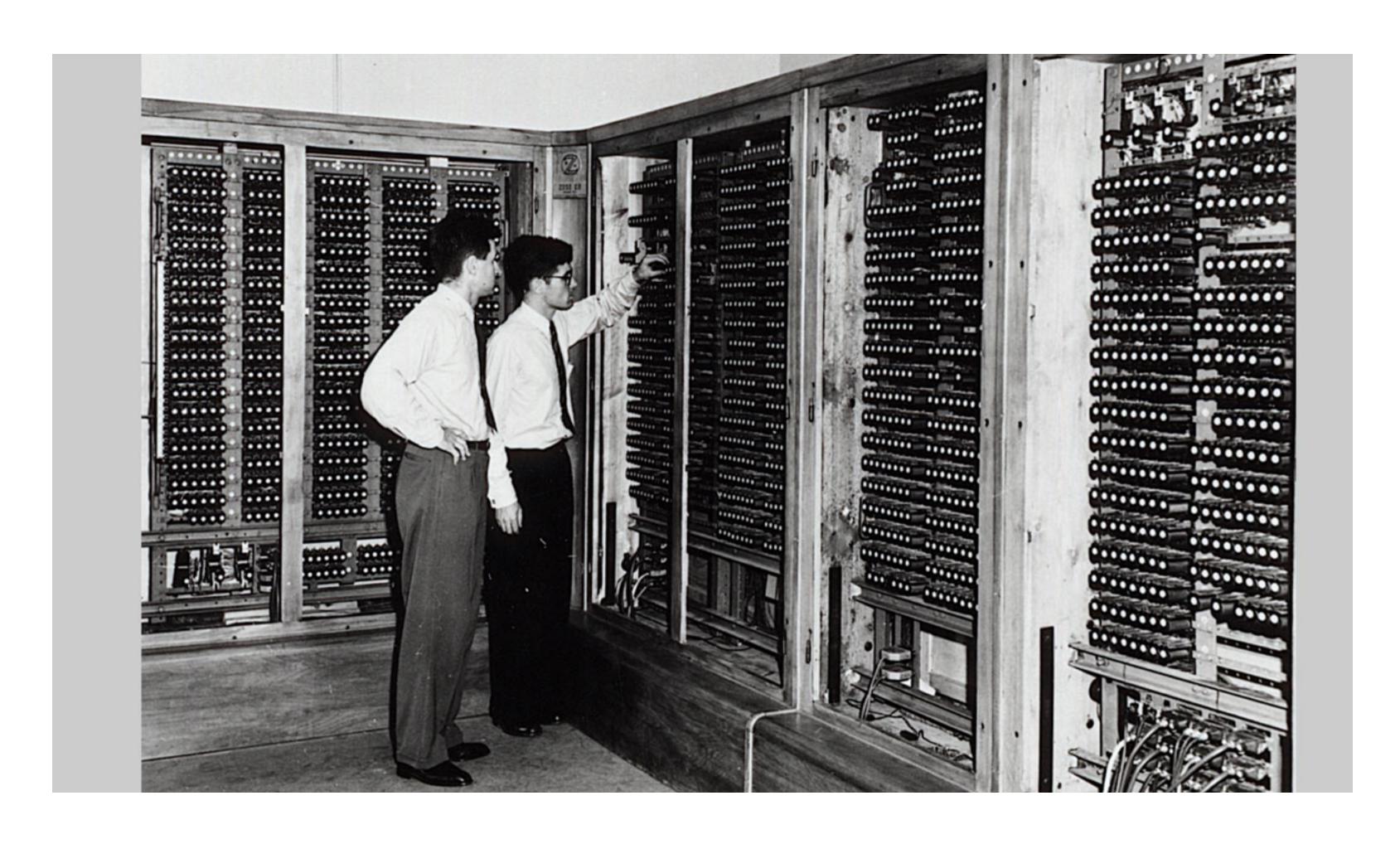
first electrified loom were using cards with punch holes to produce custom patterns. this is maybe one of the first applications for 'programming' – although still in the early stages.



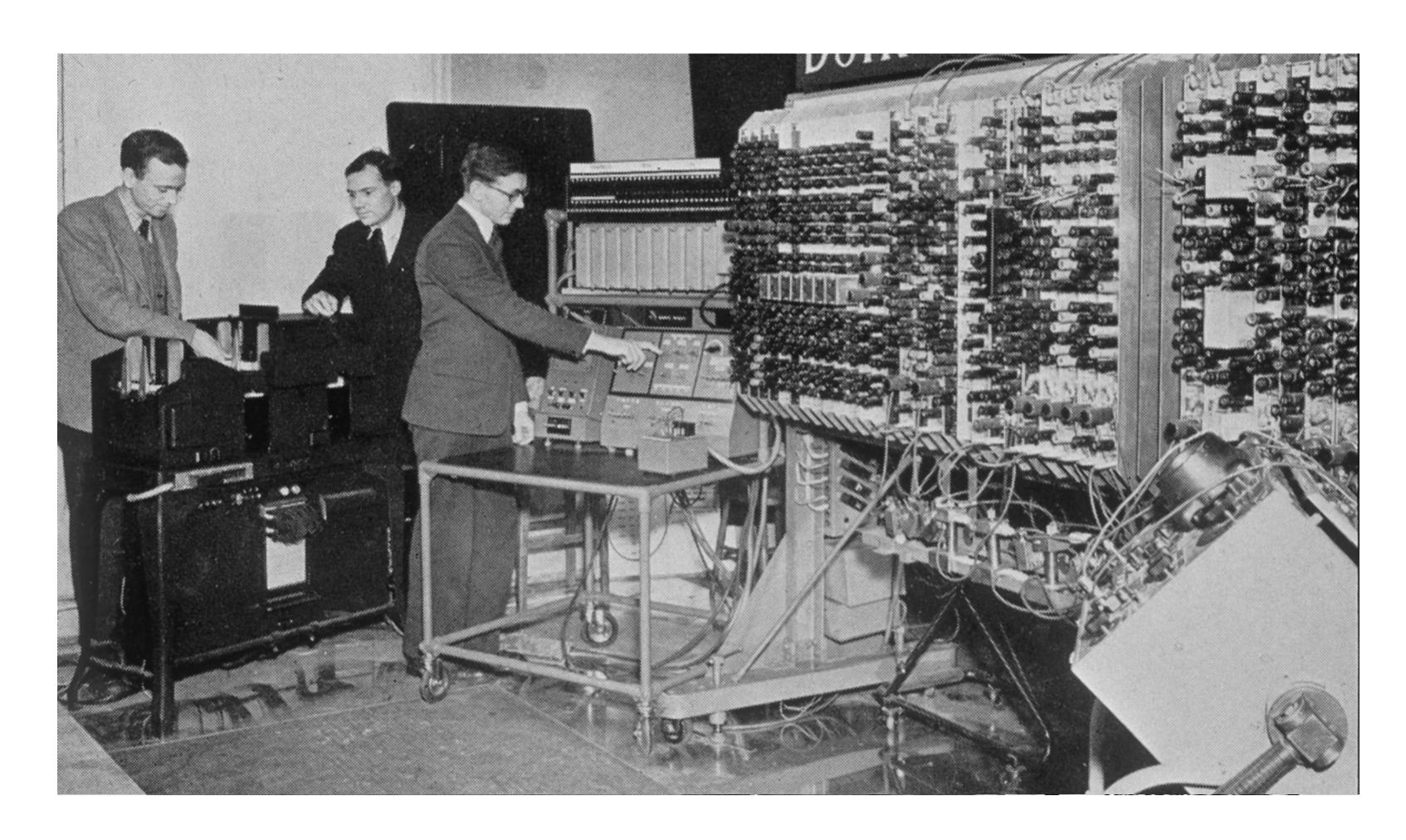
another well-known swiss company introduced the first electrified laundry room with tumbler and washing machine. although still in another style these devices demonstrated how technology was conquering our homes.



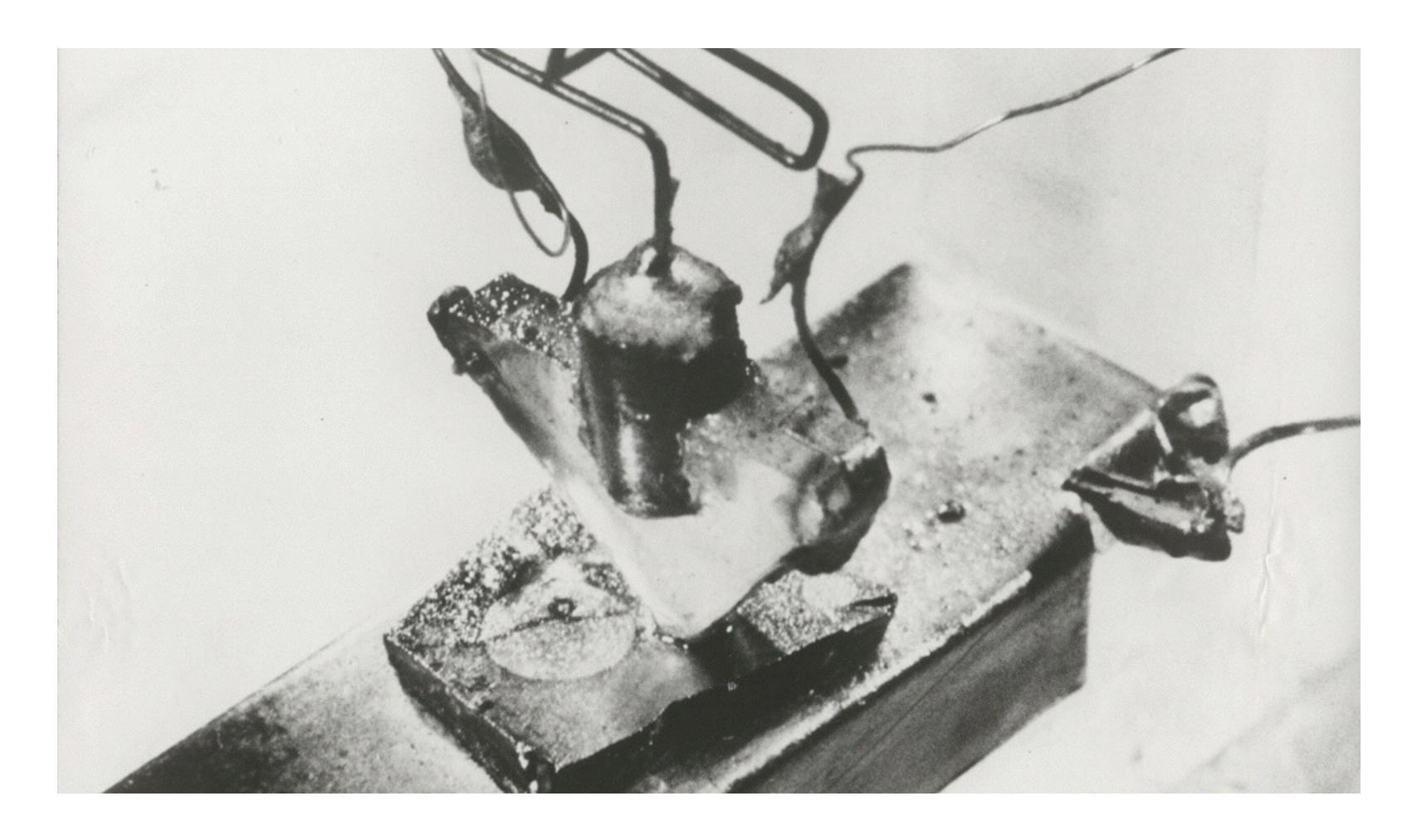
a few years later we had a shift from pure electrified devices towards machines that were more and more intelligent. especially konrad zuse is to be mentioned here.



another big name in the game of the early computers is alan turing who was first employed by the military to decode german telegraphy during world war two.



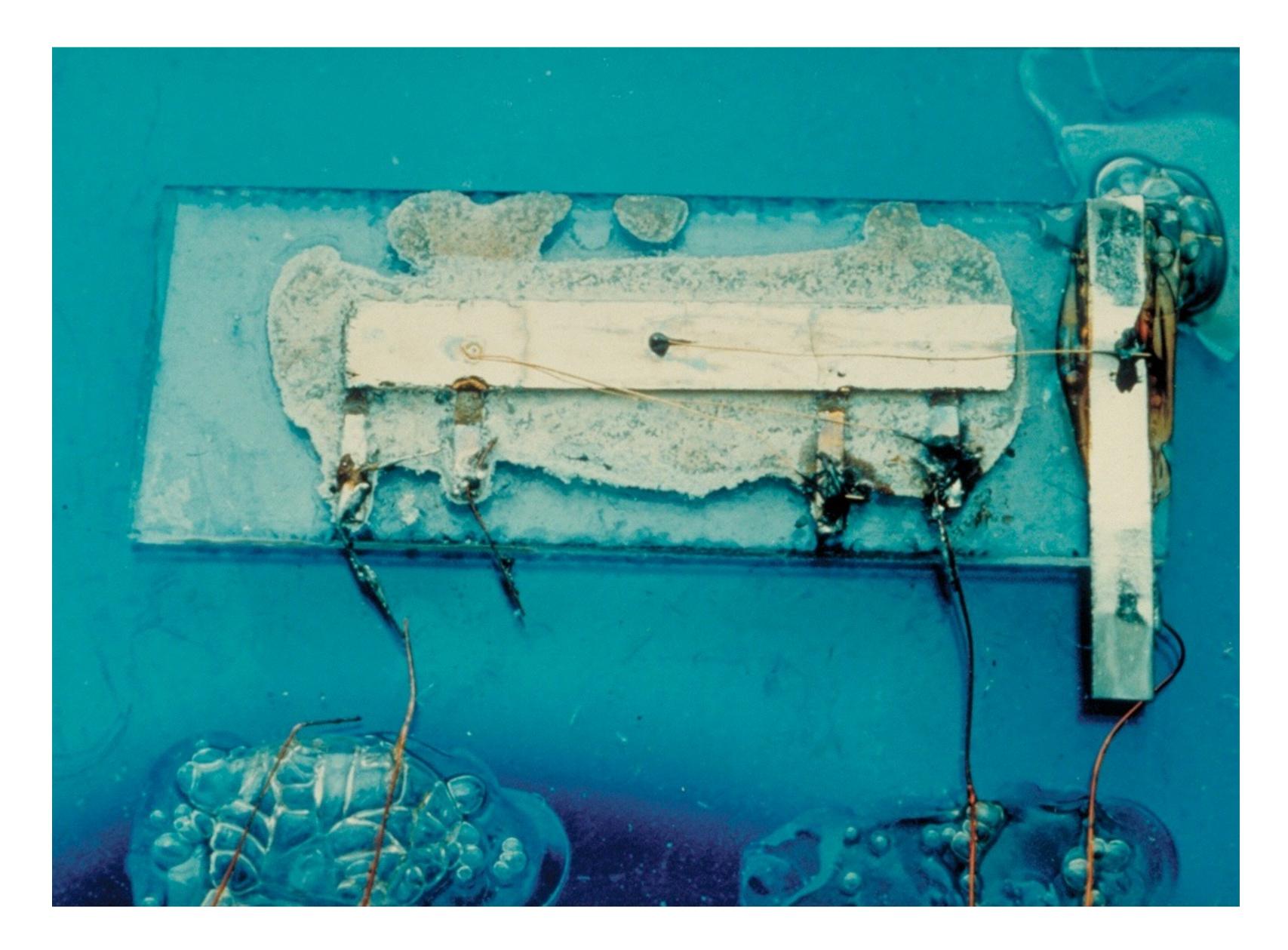
it was in the late 40' that an invention from the bell labs was introduced which should change the possibilities of the computer industry.



and make housewives happy;-) really! it was the time where more and more products for everyday use were introduced. this caused a new challenge – focussing the users needs and promise an easier life through the use of technology.

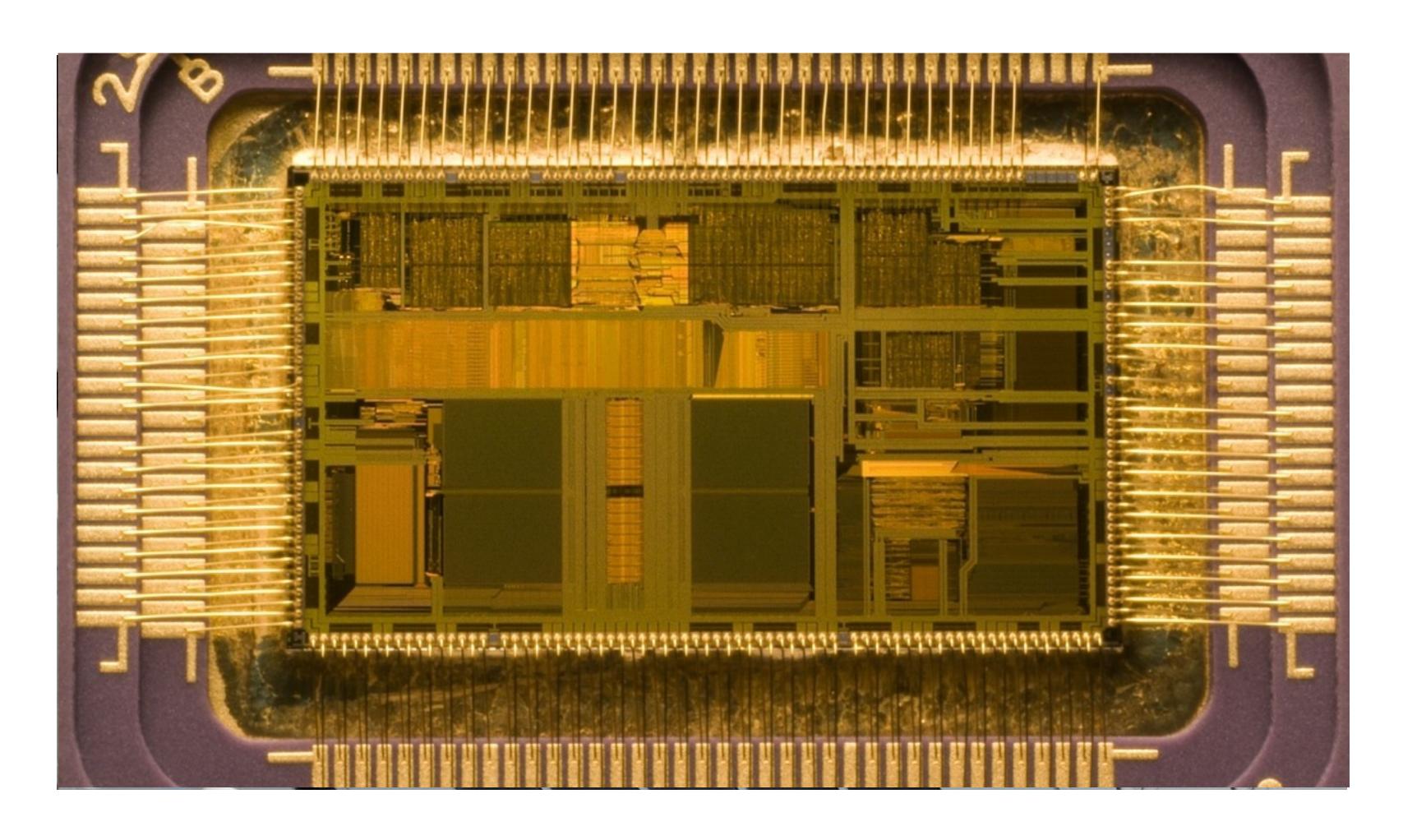


1950 vorwerk



the integration of electricity, computers and communication possibilities is the base for all modern technology.

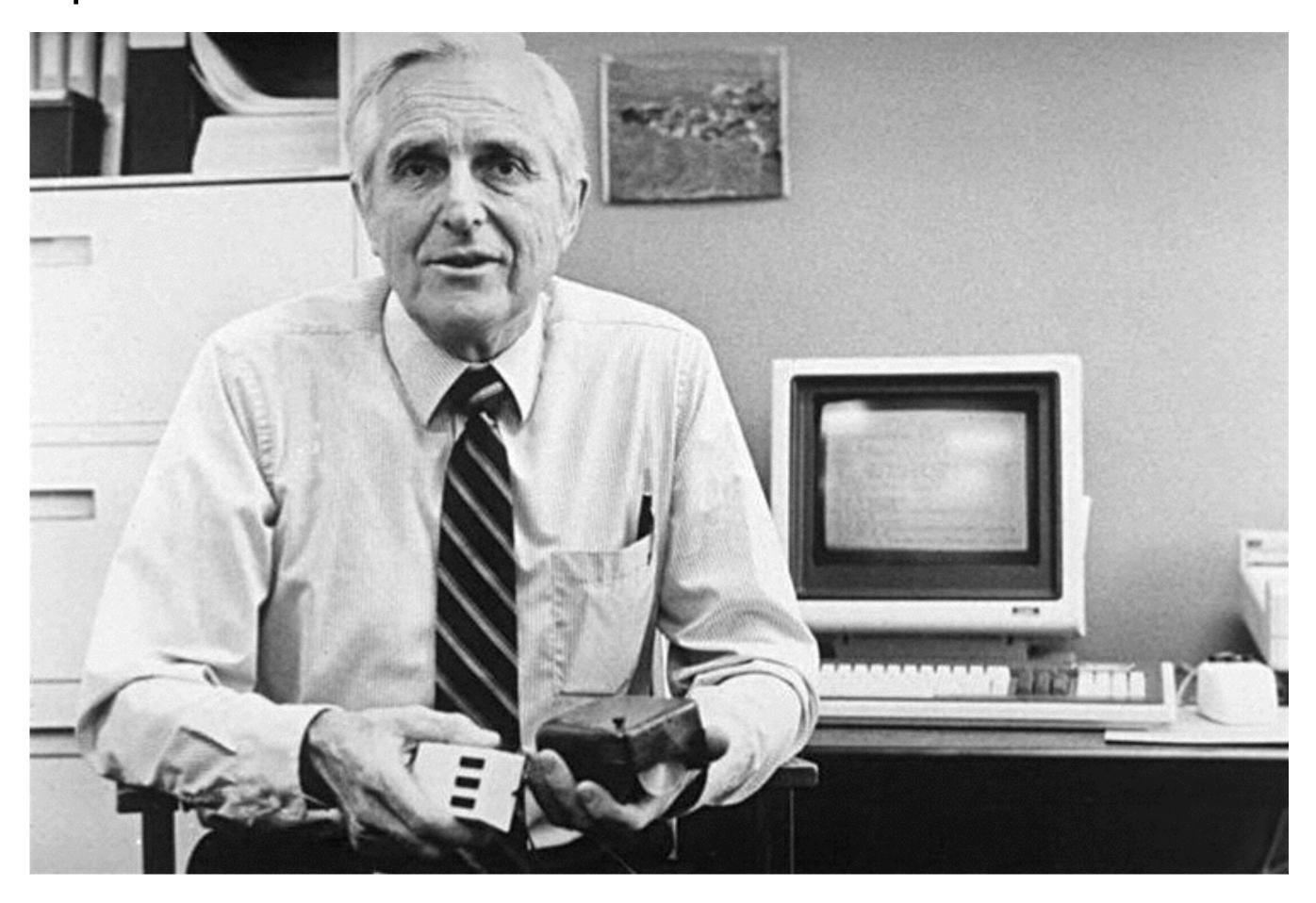
by connecting thousands of transistors on a single integrated chip it was possible to use the associated functionality much more flexible.



and with more functionality, more possibilities could be realized.



this is also the time where hardware and software engineers were experimenting with new ways to interact with our devices. especially the interaction with the computer became more and more important.



even concepts of how computers could transform from big machines into small, portable devices (gadgets) were introduced.



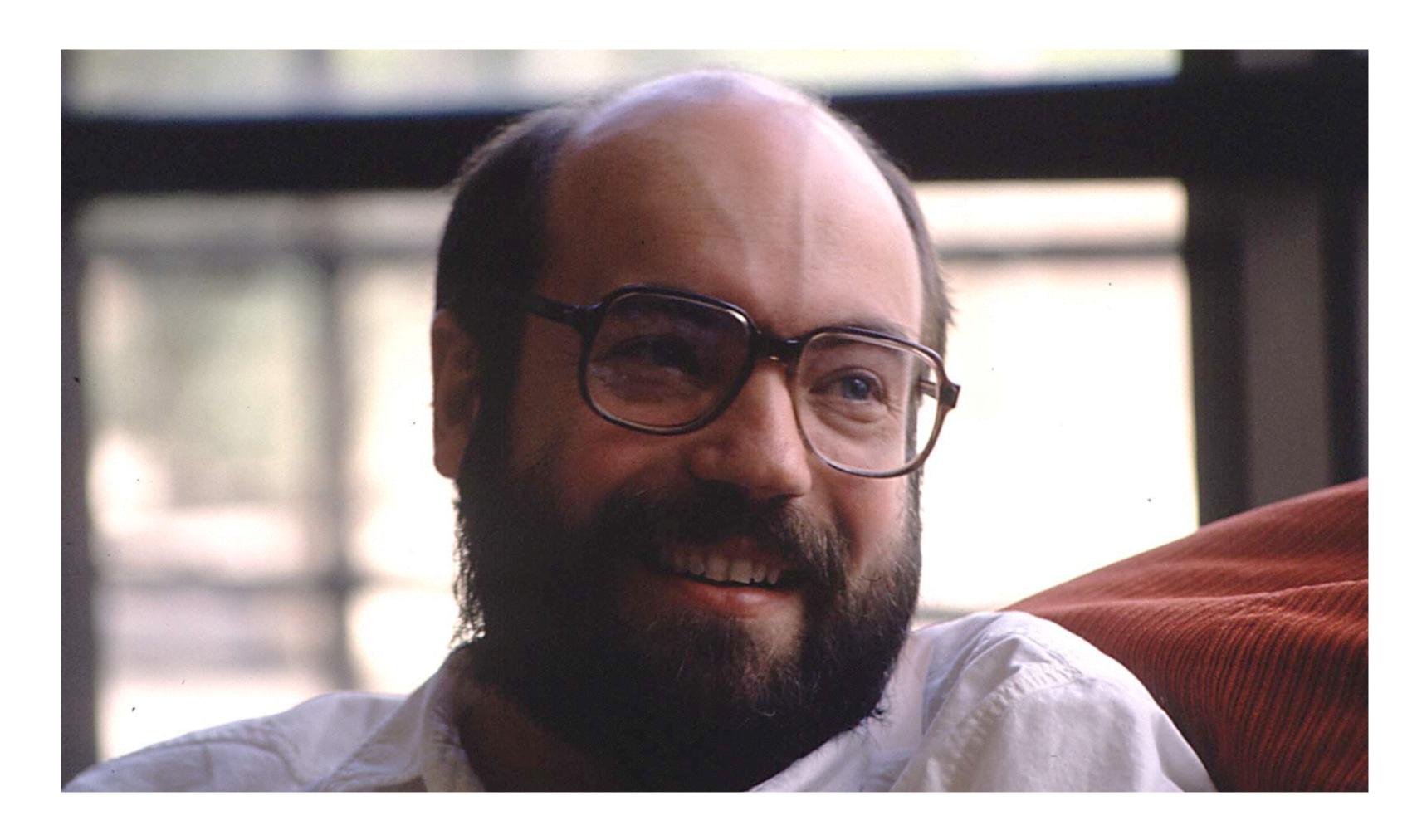
by the way... alan kay is the one who will form the phrase: DOING with IMAGES makes SYMBOLS. this phrase describes the development of computer interfaces and is fundamental for every interaction designer.



www was the basic technology – which already has been developed as a project of military universities in the us – when tim berners-lee introduced the concept of html at cern in geneva.



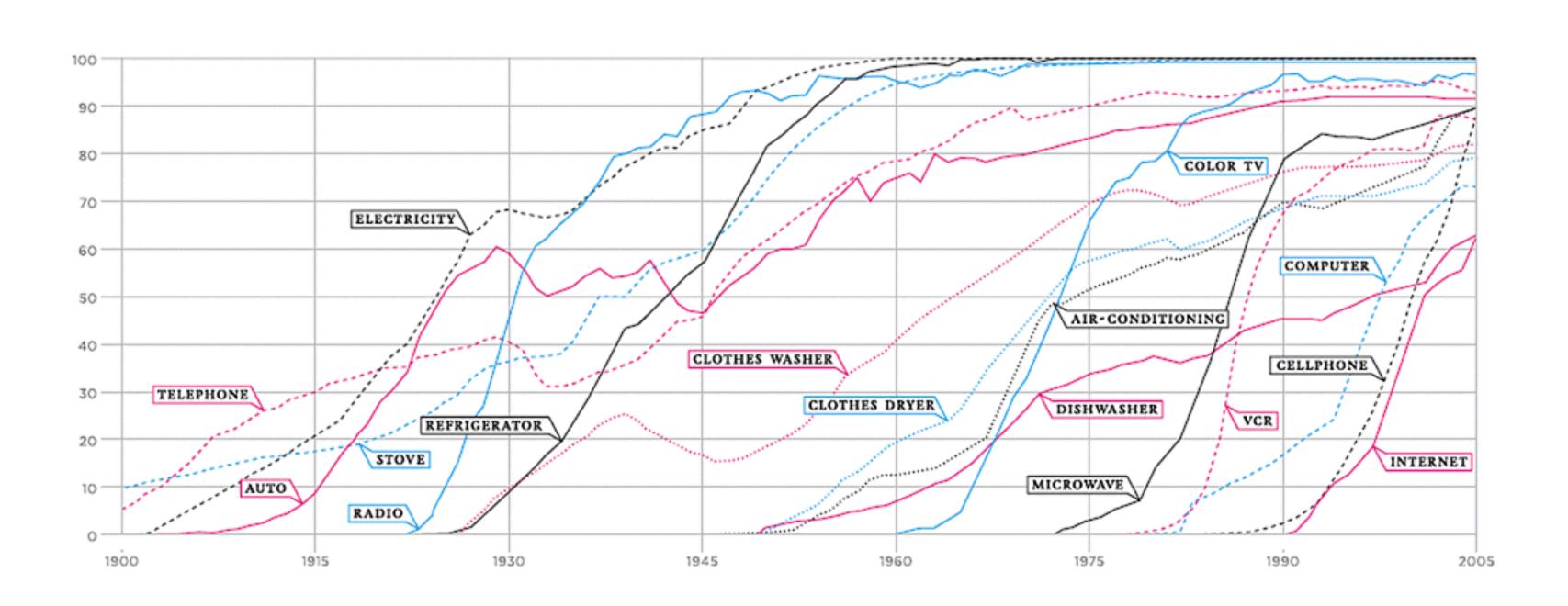
this guy though at the same time how cool it would be to have a fridge that could be integrated in the internet.



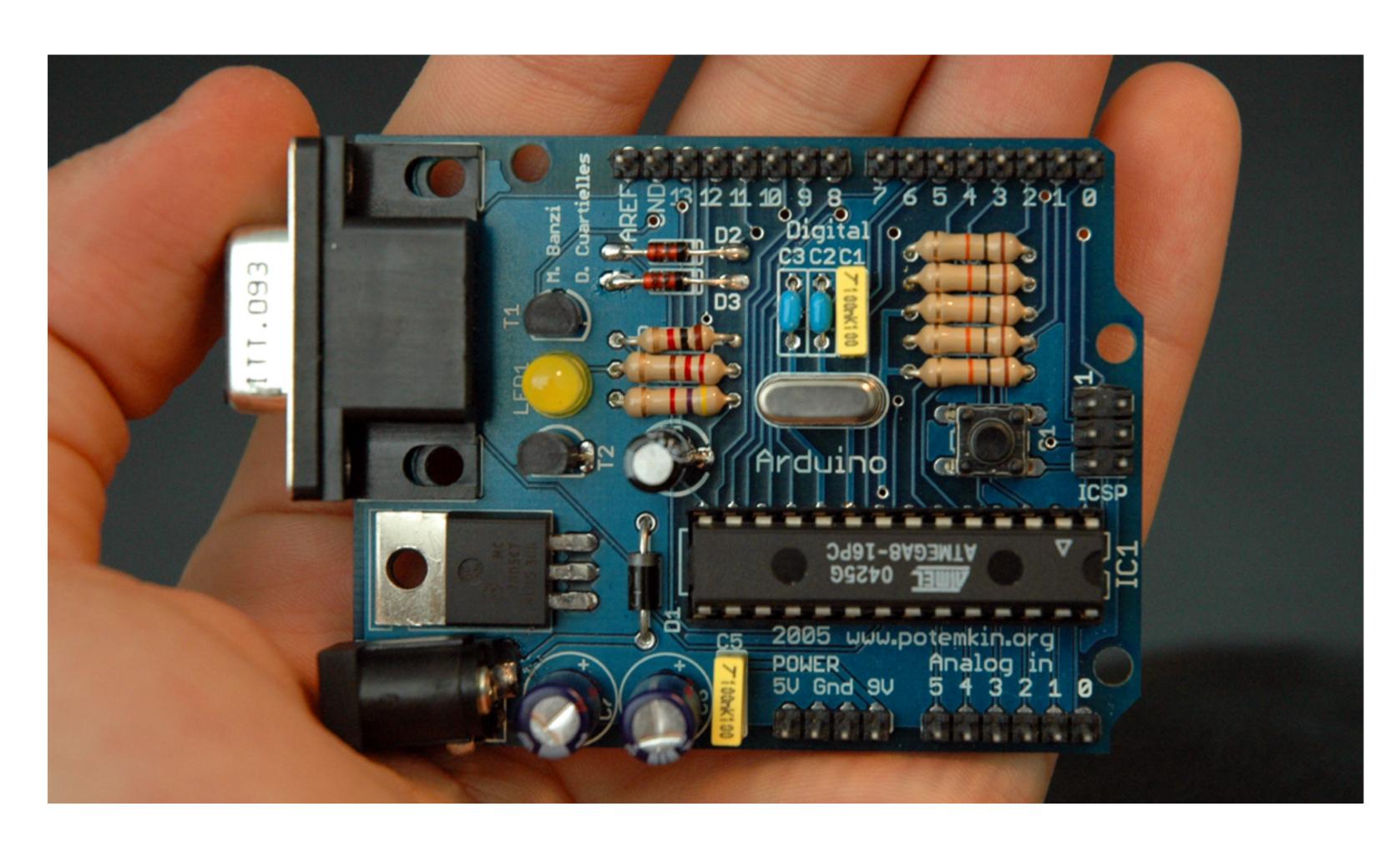
and a company in cupertino thought how cool it might be to do the same stuff that many others did before – but more consequent – and earn a hell lot of money – until today.



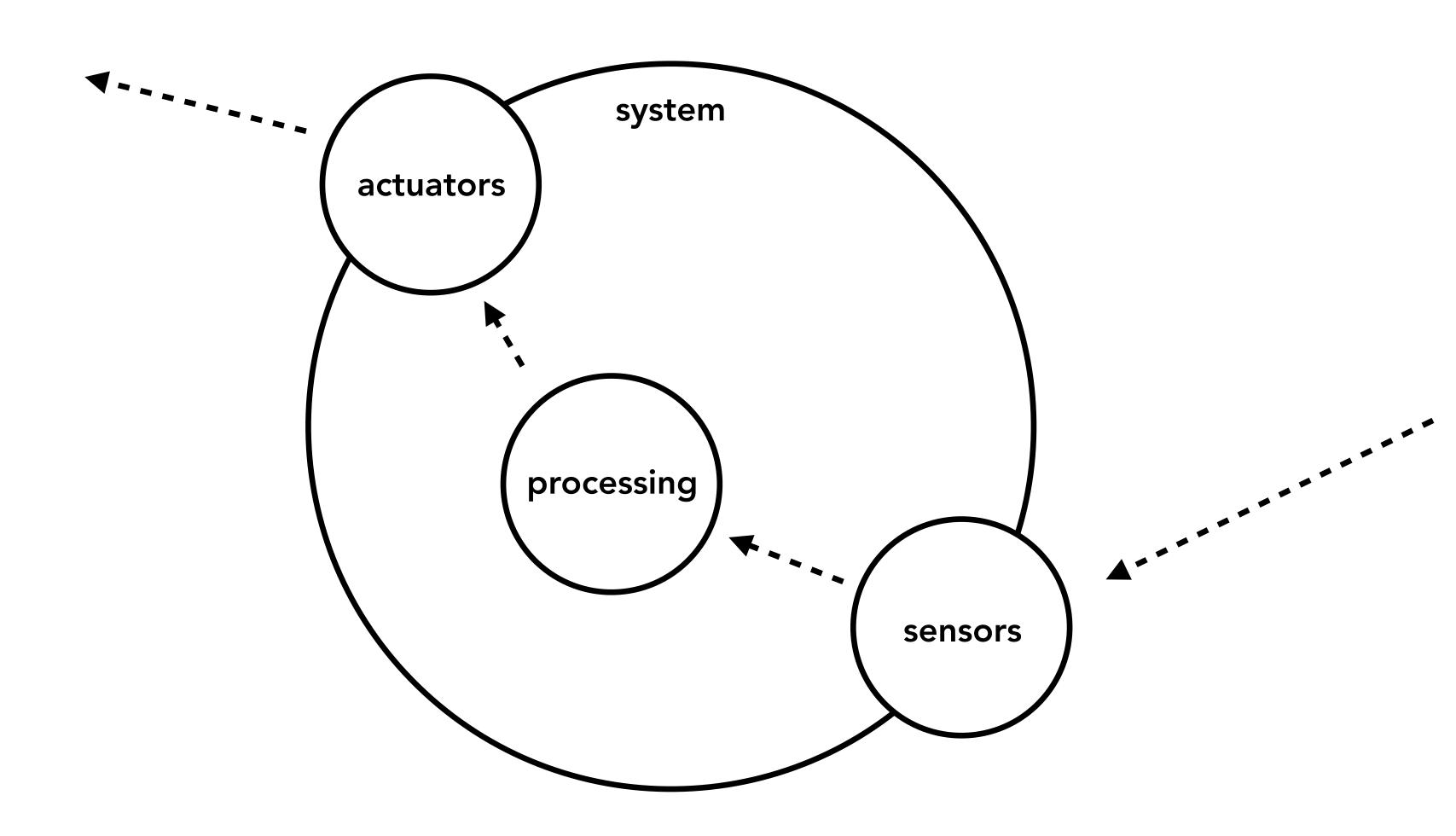
if we look at the rapid growth of technology we have to be aware that we take a big responsibility how technology is perceived and used.



therefore we can learn what technology can do and what technology can't. the perfect starter is the arduino platform which was build for interaction designers.



we use arduino to sense events in the real world through different sensors. we then process this information and react through the use of actuators.



the goal this year is to build an interactive installation where all your objects are interconnected and respond to each other. ready?



resources:

shock and awe, documentary – bbc doing with images makes symbols – alan kay arduino documentary – vimeo

physical computing – tom igoe make: electronics – charles patt getting started with arduino – massimo banzi getting started in electronics – forrest m. mims (1983) arduino cookbook – michael margolis programming interactivity – joshua noble making things talk – tom igoe (2011)