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A DUTCH UNIVERSITY.*

WE have passed by the Dutch Universities so long in our desire to absorb the culture of Germany, that we have known but little of the work of this small country in which there are real intellectual giants. At this time particularly, it is a source of great satisfaction to know that all of the university work of Europe is not at a standstill and that in Holland, almost surrounded by hostile forces and nearly always within the sound of the heavy guns in the North Sea or Belgium, university life remains almost undisturbed by the tremendous events transpiring all around it.

The following is a short account of a journey to the University of Leiden, and, since much of it is the result of personal experience, the first person is used rather freely.

Last winter Professor Kamerlingh Onnes, the director of the physical laboratory at Leiden, invited me to undertake some work with him and his colleagues. A bit of work I had done had raised a question between us and it was partly in hope of settling this and partly to see and become acquainted with the work of his laboratory that I hastened to accept. His colleague, Professor Kuenen, whom some Queen's professors may remember as professor of Physics at Dundee, some ten years ago, is perhaps the leading authority on mixtures and their properties, a matter in which I was and am keenly interested. For the progress of my own researches, these were the two men who could give me the advice I needed, and the opportunity of working with them on low temperature research was very attractive.

I was not at all sure that I should get there, but it seemed worth trying. Ocean travel in these times is diverting, and

*A lecture given before the Queen's Alumni Conference.

particularly last March at just the time when the *Tubantia* and *Sussex* were torpedoed was decidedly interesting. The trip through the English Channel and the North Sea could hardly be called monotonous. White-faced shivering stewards, multiplication of life-rafts, piles of life-belts, life-boat drill, etc., gave a feeling of uncertainty. I was on a Holland-American liner from New York to Rotterdam, and I was interested in comparing our methods of sailing with those of transports and other boats to and from English ports. We were not convoyed at all, and instead of darkening the ship at night, we went along with every light blazing, and the ship's name, *Noordam*, in letters of light, three feet high, showing on either side.

Nearly all of our passengers disembarked at Falmouth and we were held there for twenty-four hours in that very beautiful harbor. We left New York with our decks covered with snow, while at Falmouth we found everything green, and could see the men plowing on the hillsides. Although we were not allowed ashore, the only disagreeable feature of our stay here was our confinement for many weary hours in the second cabin saloon while the passengers for England were examined. Then our turn came. Each one of us was examined by a group of English army officers, as to destination, purpose of journey, etc. A letter I carried from Principal Gordon to Professor Onnes, shortened my examination to the merest routine. These young men were exceedingly polite and considerate but had the appearance of not being in love with this kind of work. There were in the first cabin one German woman, nine Dutchmen, one Belgian, and myself—a very light list. The German woman came in for a very thorough examination at the hands of a most competent looking lady examiner, but was allowed to proceed. The night we lay in Falmouth harbor every light was extinguished, or covered, so that not a single ray should betray the location of the harbor to hovering Zeppelins. From Falmouth to Rotterdam was, of course, the most exciting part of the journey where the nervous tension constantly increased. We were held again at Deal for a day, and our ship's papers, which had been removed at Falmouth, came on board again, having been taken to London, examined and sent on. We lost three of our passengers at Deal in a second examination by

British naval officers. These people were evidently Germans, and came from the second cabin. On the journey from Fal-mouth to Deal and on through the North Sea, one gets an idea of the magnitude of Britain's task of controlling the seas. Scout boats everywhere, many of them carrying business-like looking guns at the bow, destroyers, singly or in groups, monitors, hydro-aeroplanes, and the mine sweepers keeping the channel clear make it possible for supply ships and transports to keep their uninterrupted procession to and from the continent, as though there were no such things as U-boats. I counted fifty boats at anchor at Deal, where they must all stop for examination before proceeding. It was at that time, last March, a very busy place.

Leaving Deal, we skirted the English coast for a few hours and then turned sharply to the east and crossed the really dangerous part of the North Sea. Here there was much wreckage, such as boxes, parts of boats, even pillows floating on the water, which told the story of what had happened and what might happen again. The fact that our boat had struck a mine on a previous trip made officers and crew very anxious. But we saw neither mines nor submarines. The sea was calm, the sun was bright, and it was difficult to believe in the reality of the danger. In our small party of eleven, not counting the German lady who was not very popular, we became very well acquainted with each other and with the ship's officers. The captain asked me if I expected to get to Holland, and when I replied, "I hope so," he said: "Hope so, that is the way to talk of going to Holland nowadays." We passed a tug at anchor and the word came from her that the divers were searching for the wreck of the *Tubantia*, and thought that they had located her. Soon after we came to the *Noord Hinder*, the Dutch lightship, and all danger was over. We anchored at the mouth of the *Maas* to wait for the tide and the next morning found ourselves at the dock in Rotterdam.

While in British waters, we carried a large black cone in the rigging in the bow, which is the sign carried by all ships trading with Holland that the cargo is consigned to the Netherlands Oversea Trust, or N.O.T., as it is called. This is an organization founded by the president of one of the big Dutch

oversea trading firms doing business with Java and Sumatra. In the early days of the war there is little doubt that many imports were received to be transhipped to Germany. Britain felt the necessity of stopping all imports to Germany through neutral countries and made it clear to these countries that this sort of trade must stop. If it did not, they were in danger of having all their trade stopped. Holland's colonial trade is absolutely necessary to her and it would never do to have it cut off. It became necessary in some way to co-operate with Britain. While the government could not do this, it could be done by individuals, so the N.O.T. was formed, which virtually says to Britain, "we will not allow any imports to reach Germany," and the way this promise is carried out is somewhat as follows: Every one who imports goods into Holland must do so through the Overseas Trust; he must deposit with the Trust a bond the amount of which is the full market value of the cargo, and must guarantee that none of it, either in the raw state or converted into manufactured articles, shall get to Germany. The bond will be kept by the Trust until the end of the war, and the interest on it keeps the machinery of the Trust going. If the guarantee is not kept, and any of the material gets to Germany, the bond is forfeited. From a small affair of twelve men the Trust has grown until over one thousand people are employed, who not only carry on the business but keep track of the goods even to the retail dealers. The following outline of the Trust's work was taken from its advertisement in *La Gazette de Hollande*, a little paper printed daily in both French and English at the Hague. It shows the scope of its operation.

Netherlands Oversea Trust, THE HAGUE.

		<i>Address</i>
	[Secretariat	Noordeinde 35.
DEPT. No. 1.	{ General Affairs	" 35.
	General Affairs II	Paleisstraat 2.
	{ General Statistics	Parkstraat 105.
" " 2.	General Correspondence	Noordeinde 35.
" " 3.	Consents	Lange Voorhout 27.
" " 4.	Contracts	Parkstraat 107/9.
	(Files)	" 107.
	(Writing of contracts)	Alexanderstraat 13.

"	"	5. Bills of Lading	Parkstraat 18.
		(German)	" "
		(Postal parcels)	" "
		(Administration expenditure) . .	" "
		(Auxiliary Cash)	" "
		(Statistics)	" 22.
"	"	6. Bookkeeping (Cash)	Oranjestraat 13.
"	"	7. Control	" "
"	"	8. Linseed	Mauritskade 47.
"	"	9. Telegrams	Nassaulaan 18.
"	"	10. For Shopkeepers' Associations, etc.	Lange Voorhout 27.
"	"	11. Complaints and Information . . .	Oranjestraat 13.
"	"	12. Grain and Cattle Fodder	Mauritskade 47.
"	"	13. Guarantees	Parkstraat 27.
"	"	14. Cotton, Wool, Asbestos, Cocoa, Capoc	" 4.
"	"	15. Advisers	" 105.
		Distribution Bureau for Hides and Tanning Materials	Mauritskade 47.
		Commission for Netherlands Trade	Oranjestraat 13.
		Sub-Commission A for Netherlands Oversea Interests	Laan van Meerderev't 7a
		Sub-Commission B for Foreign Trade	Amaliastraat 2.
		Bureau for Edible Fats and Oils	Nassaulaan 18.
		Commission of Experts	" "
		Margarine Consumption Control Bureau	" "
		N.O.T. Advisory Commission, Oils and Fats sec.	" "
		N.O.T. Bureau to Supervise the Consumption of Fats, Oils and Oil-bearing Nuts	" "
		Wool Commission	Parkstraat 27.
		Commission in respect of the Feeding of Man and Beast (Royal Netherlands Relief Committee)	Amaliastraat 2.
		Export Bureau (Department of Finance)	" "
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		Warehouse of Printed Matter	Mauritskade 47.
		" " Office Requisites	Noordeinde 35.
		Installation Bureau	Paleisstraat 2.

One consignment of cocoa beans came into the country through the Trust and was made into chocolate and distributed to the dealers. German agents quietly collected this chocolate in small quantities from the retailers until a large amount was gathered and shipped to Germany. The Trust agents at the border discovered it and immediately notified the dealers and importers that if this happened again the supply of cocoa would be stopped entirely. The regulations of the Trust are very rigid, and carried out most thoroughly, as the following

will show. A friend of mine had married an English woman, and wished to bring some household furniture to Holland from her home. The Trust agents demanded the regular bond and my friend finally settled with them by promising to allow them access to his house whenever they wished, to see if the furniture were still there, and had not been shipped to Germany. Thus it is seen that Holland is a compulsory ally of Great Britain. Of course, the strength of the Trust is after all the British Fleet, which might stop all trade if the regulations of the Trust were evaded too frequently. It may be said safely that almost no imported articles get to Germany through Holland. This is not the case, however, with produce raised at home. Export of cattle and vegetables are enabling the farmers to reap a harvest of guilders. In the fish trade, measures restricting exports have been adopted which are being tightened gradually. I heard many demands for stopping all shipments of food from Holland owing to the tremendous rise in prices.

I shall not soon forget the morning we arrived at Rotterdam. Not knowing any Dutch, and being quite alone, I was puzzled to know how to get to the station. There were no cabs at the dock, and, after waiting for a long time, I finally got a big Dutchman who came by with a push cart to load my baggage on to the cart, and off we went across the city, he pushing and I walking behind. Of how I got my tickets and into the train to the Hague and, after two days there, how I got to Leiden, I remember very little, but travelling in Holland is very easy and knowledge of English widespread. One of the first things I noticed was the great number of soldiers marching through the streets and drilling in the open field. In front of the hotel at The Hague is an open field, much like our own cricket-field in Kingston, and squads of recruits were receiving instruction. The uniform was bluer than the one which is now so familiar to us, but at a distance the men looked much the same as we see here. There are 250,000 men actually on war footing and most of these are on the German border. At that time there were 600,000 in training with an additional 200,000 to be called out. The expense for maintenance of the army is about \$8,000,000 per month. Service in the Dutch army is compulsory and the men are called out in drafts as needed.

I was glad to arrive finally at Leiden, described by Lucas as, "a paradise of clean quiet streets, a city of professors, students and soldiers." It is the birthplace of Rembrandt, Jan Steen, Gerard Dou, the home of Grotius, Boerhaave, Arminius, and many other famous men, and is now the seat of the most famous low temperature laboratory in the world. The streets for the most part are narrow and crooked, and without sidewalks. Bicycles, military motor cycles, street cars and automobiles make the life of the new-comer full of alarms. Some of the canals are very beautiful, but the odor is quite otherwise, as the water is stagnant, with neither in-flow nor out-flow, save when the gates at Nordwyk are opened at low tide to let water out into the sea. The canals are really not much better than a huge open sewer, and malaria is not uncommon, as I found to my discomfort.

Old Leiden is completely surrounded by a series of canals or Singels as they are called, which were once a part of the protective works of the city. Some of these, the Witte Singel and the Zoeterwoudsche Singel, are very attractive, especially when the horse chestnut trees, which line their banks, are in full bloom. On many of the smaller canals or ditches, which serve as fences, there is a vegetable growth which is a brilliant red with a trace of green on the edges of the very small leaves. It is said to have been imported from Canada, but I never saw anything like it before. I thought of Professor MacClement, and wished that he might take his Botany class for an excursion here. Holland is the land of flowers and the tulips and hyacinths are beyond my power of description. The best way to see them is from the train between Leiden and Haarlem, in the heart of the bulb country. What from the train is a solid mass of colors, becomes individual flowers and ugly straw when seen too near, while all around are the bare hedges with a few brown leaves, not pleasant to the eye. The hyacinths, especially the dark purple varieties, are more wonderful even than the tulips, although the later Darwin tulips are very beautiful. The soil seems to be a remarkably light loam of very fine texture.

A young artist friend suggested a stroll one day, and took me first to St. Pieterskerk, the largest church of Leiden, built in the early fourteenth century by the Roman Catholics. Many

of Leiden's famous men rest beneath the stone flags of the floor. Apparently no one goes to church nowadays, at least I found no one who would go. The service is very dull, the sermons doctrinal, the hymns are droned sleepily and the collection baskets are passed four or five times during the service, so that the uninitiated spends rather more than he expects, or must decline to contribute to later offerings altogether. If these things are not enough to keep people away from church, the men and women are not allowed to sit together but must take their seats on opposite sides of the church.

This young artist was a sergeant in the army and had been in service since the beginning of the war. He told me many interesting things, one in particular impressed me. The Dutch army was mobilized four days before the war broke out, and was ready at the German frontier to repel an invasion, if such were attempted. No one seems to know the source of the information, but the Dutch say that this is what kept them from the plight of Belgium. Feeling against Germany is very strong, as the cartoons by Raemaekers show. The Dutch are justly proud of him, and his works seem to be as acceptable to a large portion of the Dutch people as to us. One very effective cartoon shows the attitude of the Dutch to the suffering Belgians. While so much of the history of the two peoples is common, the feeling between the countries has not always been of the best, but the coming of the Hun gave the Dutch people an opportunity to display their brotherhood. It has been said that there is no tenderness in the Dutch character, and in some respects this criticism seems justified, but in their home and family life there is no lack, and in their treatment of the Belgian refugees they have certainly disproved the statement. Holland carries a great burden with the hundreds of thousands of refugees, the 21,000 Belgian soldiers interned at Zeist, the 4000 English at Gronigen, and the small body of Germans at Bergen, to say nothing of the burden of the large standing army.

Regarding the sentiments of the Dutch concerning the war, of course my one language brought me in touch with pro-ally people more than others, but I took some pains to ask my friends about it, and the answer always was, "strong for the cause of the allies." The government and the higher offi-

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cers of the army are pro-German, while the common people and the army itself are anti-German in most cases. Where there is pro-German feeling amongst the people, it is largely among the Roman Catholics, for reasons I do not understand. Roughly speaking, the division in Holland is much as it is in Greece and in Sweden. In Holland it is not difficult to explain. Germany is very near and has been very closely related in trade and education with the Dutch. Prince Henry—a stupid fellow—is German, so the Queen is inclined that way. The army is patterned after the German army, so the higher officers naturally incline to German support. The Queen is, however, above everything else, pro-Dutch, and may be counted on to do what she thinks best for her country. A young captain in the army, a pro-German, told me that he thought that nine-tenths of the people were anti-German. The plight of Belgium is very real to Holland and she does not intend to suffer in the same way. Her people are not warlike but are determined to maintain their neutrality. Mr. Van Dyke, the American ambassador, told me, "if Holland is drawn into the war, it will be as her interests dictate rather than her sentiments." And her interests will not take her to the side of Germany.

The Breestraat is the principal street of Leiden, on which there are many fine old buildings. Running to the south is the Rapenburg, one of the finest of the canals, and on its western bank is the university. The first time I came to it, I was not certain that I was at the proper place, but after waiting for a few minutes I saw a great many young men and women whom I knew to be students, who look much alike everywhere. I finally picked out an intelligent looking youth and asked if he spoke English. "A little," he said. They always say, "a little." So I asked if he could tell me where I could find Professor Omnes. The reply was, "I don't know, you might ask the porter." He finally agreed to help me and we went inside and found, not the porter, but his daughter, who gave the necessary directions, "Professor Omnes would be at the *Physisch Laboratorium*, which is about a quarter of a mile down the Rapenburg." Thus I came to the end of my journey.

State university education in the northern Netherlands dates from 1575, although there had been institutions where the culture of Italy had taken root, as at Groningen, Zwolle,

and Deventer. Anyone wishing a university degree had to go to Bologna or Padua, Paris or Orleans, Marburg, Heidelberg or Cologne, or across the channel to Britain. There were universities at Douai and Louvain in the south, but these were closed to the students from the north. When Holland rose up against Spanish domination in 1568, a fierce struggle for political and religious rights began which after 80 years led to the recognition of the Republic of the United Netherlands. The early years of the rebellion were disastrous to the Dutch, but eventually their great leader, William the Silent, through the brave resistance at Alkmaar and Leiden and the raising of the siege at Leiden was able to drive the Spaniards out. The siege of Leiden was raised only by opening the dykes, inundating the land all about the city. This weapon of the low countries, used by the Belgians to stop the expedition to Calais, is ever ready to serve intruders in this same fashion. So much of the country is below the water level that many square miles may be inundated in a few hours.

The bravery of the people of Leiden during this siege is of the same kind as has been shown in Belgium in the past two years. They fought with only one thought, that of resistance. During the siege of Leiden, according to Motley, some of the people, disheartened by starvation and the failure of the Prince to help them, urged the burgomaster, Adrian van der Werf, to surrender. He replied, "My life is at your disposal; here is my sword, plunge it into my breast and divide my flesh among you. Take my body to appease your hunger, but expect no surrender so long as I live." Back they went to the walls and this is what came down to the ears of the Spaniards: "Ye call us rat-eaters and dog-eaters. It is true. So long then as ye hear a dog bark or a cat mew within these walls, ye may know that the city holds out. And when all have perished, be sure we will each devour our left arm retaining our right, to defend our women, our liberty and religion against the foreign tyrant. Should God in His wrath doom us to destruction and deny us all relief, even then we will maintain ourselves forever against your entrance. When the last hour has come, with our own hands we will set fire to the city and perish, men, women, and children together in the flames, rather than suffer

our bones to be polluted and our liberties crushed." This spirit is not dead and if the Germans try to cross Holland it will rise up again.

Eventually the siege was raised and relief came in boats sailing over the inundated country, aided by high winds that rolled the water in over the land to a depth great enough for their purpose, on the very night that a great portion of the wall fell down through which the Spaniards might have passed. According to tradition, which I found smiled at by my friends, the University of Leiden was founded as a reward to the heroic defenders. The story is that the Prince offered the people of Leiden relief from taxes, or a university, and that they chose the latter. That the university came here as a reward is true perhaps, but the people were probably given no such choice. The want of higher educational facilities had been keenly felt and a University was needed as a training college for theologians, which the Prince described as "a strong bulwark in the struggle for the freedom of the faith." Theology was the important thing for which the University was founded, although this was not stated openly. It seemed necessary to get the University established before peace negotiations were completed, so plans were hastily carried out, even though the financial condition of the country was very bad. The University of Leiden came into being on January 6, 1575, and was established in the name of the King by the Prince of Orange, who commanded its erection and forbade any other in the provinces of Zeeland and Holland. Others followed in the north at Franeker, Groningen, Utrecht, Harderwyk, and Deventer. When the Netherlands were annexed to France in 1810, only Leiden was left as a part of the Imperial University of Paris. The others were reduced to secondary schools, but after the Restoration, in 1813, were revived. Those at Harderwyk and Franeker have since died out, leaving only Leiden, Groningen and Utrecht. Later the Polytechnic School at Delft was promoted to University grade, and these four together with the Municipal University at Amsterdam are now the seats of higher learning in Holland. There is also a private university in Amsterdam, which does not form part of the state system.

These four universities are organized and governed in the same way, and have equal rights, but at Amsterdam there are some differences in the manner of making appointments and the regulation of salaries, these matters being handled by the municipal authorities. In the others, all appointments are made by the Queen and salaries are fixed by the State. Each university is governed by a board of five curators, who are the intermediaries between the government and the university. The annual budget passes through their hands, and they submit names to the Queen for the appointment of professors. They submit names of other officials to the Minister of the Interior, and also see that the laws are complied with.

Instruction is given by ordinary professors, extraordinary professors, and lecturers appointed by the Queen, and private tutors. The ordinary professors together form the Senate and receive from 4000 to 6000 guilders per year, equivalent to about \$2500, but worth about \$5000 in Holland. They may not hold other positions except by royal consent, but may carry on consulting work. This permission is stretched by the medical profession to include operative surgery. One of these professors, usually in order of seniority, is chosen each year by the Queen as Rector Magnificus. He always serves as secretary of the faculty during the year preceding his appointment. The Rector has to maintain discipline among the students and deliver an address on his retirement which takes place at the beginning of the academic year. A committee of four professors together with the Rector form a Board of Assessors for the government of the university. These are usually retired rectors, and one is chosen from each faculty. Ordinary professors retire at the age of seventy. Each professor, after appointment, delivers an inaugural address before the assembled university. This takes place in the great auditorium, and is usually some contribution to the field of learning in which he is working.

The salaries of extraordinary professors and lecturers vary very much and the distinctions between them are not clear. Private tutors are unpaid, but must obtain permission from the Minister of the Interior to teach and must have a

doctor's degree which, however, is not necessary for professors and lecturers.

The academic year begins on the third Monday in September, when the retiring rector delivers his address, in which he sums up the achievements of the year. The year ends on the second Saturday in July, and there are no closing exercises.

There are five faculties: Theology, which is the oldest; Law, Medicine, Mathematics and Natural Science, or Faculty of Natural Philosophy, and the Faculty of Arts. The fees are \$80 per year for all except divinity students, who pay only \$40. After four yearly payments, no further fees are required. These fees cover all lectures which a student may wish to take. There is an examination fee of \$20, and when applying for examination the student must present a certificate from the Gymnasium. The only degree given by the university is that of doctor in the particular subject in which the candidate is working.

The Dutch boy or girl begins school at about five and attends the lower schools and then enters the Gymnasium or High School in either of which he spends six years. In the Gymnasium, considerable time is spent on the classics; in the High School, science replaces the classics. This seems to be about the only difference. Since the classics are necessary for the doctor's degree, students who have attended the High School must get off the classics before they can receive the Gymnasium certificate necessary for permission to take the doctor's examination. This certificate seems to be all that is necessary, and there seem to be no entrance examinations to the university.

The student comes up for his doctor's examination whenever he feels that he is ready. The Dutch students do most of their work in the holidays, and apparently very little during the university session. Attendance on lectures is not compulsory, and these lectures may have no relation to the candidates' examinations. They are given by men who are leaders in their own fields and are frequently on entirely new work, and there is very little actual teaching. For example, the students in Physics last year met Professor Lorentz, one hour

per week, to hear him discuss Einstein's new Theory of Gravitation. They met Professor Onnes one hour per week for discussion of the new work in the laboratory and its meaning. Students may attend lectures or not as they like, and some never attend, although in the Department of Physics attendance is very regular. The students read for examinations and there is much cramming, a very bad feature.

There are no dormitories at Leiden, and the students live around the city much as they do at Queen's, and enjoy great freedom. While relations with professors are most cordial, there is a wider separation between staff and students than here. Rowing seems to be the only sport that receives much attention, although football is becoming more and more popular.

The candidate must pass two examinations, the intermediate and the final. Medical students are required to pass a preliminary examination in Science and the Theological students in Hebrew and Hebrew Antiquities. The intermediate examination is oral and lasts from one to three hours. The final examination is divided into two parts which are also oral. After the first part, of a rather general nature, the candidate is given a topic on which to write an essay, to be discussed in the later examination, which follows soon after the first. When he has passed these examinations, he writes a dissertation on a subject chosen by himself in consultation with one of the professors called the "Promoter", and to this dissertation, at least twelve theses must be added. The dissertation and theses are printed and sent to the professors and to others, if the candidate wishes. Then comes the final ordeal, the defence of the theses, which takes place in the Senate room in the presence of the Senate. Criticism is allowed to those who have the Rector's permission. This final exercise is attended with great ceremony. The candidate or "defendens" chooses two of his friends, "paranymphs", who arrange everything for him. They arrange the dinner which he gives, escort him to the examination hall, accompanied usually by the father, mother and sweetheart of the candidate. These guests are provided with a room where they remain while the candidate is undergoing his final test. The paranymphs escort the can-

didate to a little room just outside the Senate room, known as the *Zweetkamertjie* or little sweating room, where the candidate awaits the summons to the Senate room. These few moments in this room are probably the most uncomfortable in his whole university career. When he is called, the two attendants escort him to the Senate room and stand one on either side, to render any assistance, such as, providing a glass of water, or anything else that may be needed. They finally escort him from the room to his waiting friends and if the result of the examination is successful the dinner follows with many wild pranks. I was told that as soon as the defence of the theses was completed, the new doctor's hat is destroyed as a symbol that a new hat is now needed. This custom seems to be a relic of the old days of "promotion with cap."

As mentioned above, there is a difference between the students from the Gymnasium and from the High Schools. The students from the latter are deficient in classics and this deficiency must be made good before the candidate may proceed to his examination. Since many of the men are from the High School, there is much grumbling at this requirement, and pressure to remove it is getting stronger and stronger. It seems rather a pity that in a university where less than half a century ago all lectures were given in Latin, the classics should now be on the defensive with the prospect of being removed altogether from the list of requirements for the doctor's degree.

Many theological students finish their university work with the intermediate examination. After this they pass an ecclesiastical examination before their professors and finally a pulpit examination before a clerical committee. While the university was founded for Theological students and the work in Theology has made a world-wide impression on Theological thought, perhaps the faculties of Medicine and Natural Philosophy are the most important at the present time and have been for many years.

It was at Leiden that Boerhaave, in the middle of the eighteenth century, won the reputation of being the greatest

physician of Europe. It is said that a letter from China addressed to

Professor Boerhaave,
Famous Physician,
Europe,

reached him. It was at Leiden that the Science of Anatomy became the glory of Dutch Medical instruction. In the sixteenth century, nowhere in Europe, save possibly in Italy, could the student take up the study of the structure of the human body under a proficient teacher. Occasionally at some university a subject would be dissected by an incompetent assistant, it being beneath the dignity of the professor to do this work. In Holland, however, the study of Anatomy became of the greatest importance and the clinical lectures were delivered by the very best men, who did their own demonstrating. How popular this subject became is evident to every one who visits the picture galleries at The Hague and Amsterdam. Here are many famous pictures of Anatomy lessons. There is one in one of the rooms in the Medical Faculty at Leiden, showing an Anatomy lesson by Pieter Pauw painted about the middle of the seventeenth century. The best of all is, of course, Rembrandt's Anatomy lesson at the Mauritshuis at The Hague. The faces of the onlookers, who by the way are not students but members of the medical profession, are marvelously well done. There is another by Rembrandt in the Ryksmuseum in Amsterdam. Then there are many others in the same museum by other artists of lesser fame. These paintings give us some idea of the importance of the subject of Anatomy in Holland in the seventeenth century. To-day the Medical Faculty at Leiden is of the very highest grade. The hospital facilities are excellent and the laboratory complete. The university has its own hospital, and the laboratories are probably as good as any in the world. The course for Medical students is seven years, in which one or two are spent on the purely scientific subjects. The Medical students are more numerous than those of other faculties.

Of course, I was most interested in the Faculty of Natural Philosophy, which to-day is perhaps the best known. It has counted such names on its list as Huyghens, s'Gravesande,

Musschenbroek, Snell, Bosscha, van der Waals, Kamerlingh Onnes, Lorentz and Zeemann, either as professors or students. The last four have been recipients of the Nobel prize, a distinction which has come to no other university. My work brought me into close association with Professor Kamerlingh Onnes and his colleague, Kuenen, but I met Lorentz, Zeemann and many others at the Royal Academy of Amsterdam to which I was invited by Professor Zeemann. While in Amsterdam I called on Professor van der Waals, an old man of eighty-four, who is still keenly interested in the work that he initiated in Leiden nearly a half century ago. The evening of the meeting of the Royal Academy was a memorable one to me. The exercises began with tea, after which we sat around the table where all of the leading Dutch physicists, some of them the greatest in the world, were gathered, and we heard Professor Zeemann explain some of his recent experiments in Optics. We then adjourned to his laboratory where the experiments were demonstrated and, fortunately for me, the explanations were repeated in English. We then went back for more tea, after which there was a very lively discussion.

Any account of the University of Leiden would be incomplete without a brief description of the work of the physical laboratory. For thirty years Professor Kamerlingh Onnes has been building up the low temperature laboratory, which is without doubt the best of its kind in the world. The Dutch government, realizing how much the future may depend on discoveries in pure Science and also having great pride in its university system, encourages its professors to engage in research to the extent that they are able to relinquish nearly all of their teaching and to devote themselves to the development of their own subjects. They have plenty of time to think quietly, unharassed by student exercises, financial difficulties, or committee and faculty meetings. The work of a Dutch university professor is his life and comes before everything else.

The organization of the laboratory at Leiden is wonderfully complete and efficient. For such work as is being done there, a great many trained assistants are needed. So Professor Kamerlingh Onnes has developed a school for the train-

ing of experts, such as glass-blowers, electricians and instrument makers. After these become proficient, they are put in charge of machines or processes in the laboratory. Boys from less wealthy homes, who are ambitious and wish to better themselves, are received into this school for instrument makers at about sixteen years of age, if they are recommended by their school teachers. The course which they take is of six years duration. They serve as apprentices to the glass-blower, in the machine or wood working shops, or as electricians. Five nights per week they attend the evening High School, where they study Mathematics, Physics, Chemistry, and Elementary Engineering. Each year there are severe examinations which they must pass or repeat the work. At the end of the course they find employment in Professor Kamerlingh Onnes' laboratory, or obtain positions as instrument makers in other laboratories, and they are in demand wherever they are known. So there is an abundance of trained assistants at hand in Leiden, and if any experiment is projected a young man makes the drawings and the mechanics build the apparatus, so that in an incredibly short time the experiment is finished. One is able to accomplish in a few weeks what would take as many months anywhere else. The assistants show the keenest interest in the work of the laboratory and are most accommodating and generous with their time.

All of Professor Kamerlingh Onnes' students work on his problems and no work is done which does not contribute in some way to his general plan. Fortunately my work fitted in and I was allowed to come in as a guest and everything was done which could be done to make my stay a success. I worked with Professor Kuenen, trying to determine some matters connected with the liquefaction of air. This was so closely related to my own previous work that I was able to handle it quite easily. In connection with this research I was able to study the organization and methods of the laboratory in detail. Nothing was hidden and I could secure all the information I wished. Apparatus, methods and plans were freely discussed. My own disagreement with Professor Onnes was not entirely settled, but we were able to agree upon a crucial experiment which I expect to undertake as soon as a liquid air plant is installed here at Queen's.

Our experiments at Leiden were entirely successful and we were able to fix definitely the temperature and pressure at which liquefaction of air is possible. Before I left Leiden further work on mixtures of oxygen and nitrogen was projected and determination of the viscosity of hydrogen at the critical point was offered me for development at a future "orientation" as Professor Kamerlingh Onnes called it. But these problems would require a long time for solution and it is difficult to see how arrangements can be made for pursuing this very attractive plan. Perhaps there may be opportunities to carry on work of this kind at Queen's University.

Of the low temperature work at Leiden so much should be said that it may be left for treatment in a future paper.

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