AlB_2, although it has erroneously been written as $(1\,1\,\bar{2}\,1)$.

This system is composed of a transition element and boron, thus belonging to those, discussed by Hägg[8,9]. The ratio r_B/r_{Zr} is 0.54, assuming the radii to be 0.87 Å for boron and 1.60 Å for zirconium (12-fold coordination). It is less than the critical value 0.59 and in fact the system is very simple. A range of solid solubility of boron in the metallic lattice exists. ZrB_2, the only intermediary phase which has been found, is a typical interstitial compound with a lattice of one of the four simple types, given by Hägg, and has metallic properties. It is of interest to compare this system with the chemically related system titanium-boron with the ratio $r_B/r_{Ti} = 0.60$, for wich a short report has been published[10]. According to this report a range of solid solubility of boron in the titanium lattice exists and a phase TiB_2, isomorphous to ZrB_2 and with metallic properties is to be found. In addition a superlattice, closely related to the titanium lattice exists and further a new phase, TiB, appears. This phase is reported to have »zincblende» structure with definite linkages titanium-boron. Thus it does not belong to the typically interstitial compounds. So far as can be judged from the brief report, the system titanium-boron thus has an intermediate position between simple and complicated systems and in fact the radius ratio is very near the critical value.

The existence of phases MeB_2 of the *C* 32 type seems to be rather usual among the transition elements. In addition to ZrB_2 and TiB_2 the borides CrB_2, CbB_2 and TaB_2 are isomorphous to AlB_2 (Kiessling, unpublished). In the systems molybdenum-boron and tungsten-boron, the *ε*-phases have a lattice, partially composed of a MeB_2 lattice of the type above[7]. This may depend on the tendency of the boron atoms to form plane networks.

On the Action of *Bacillus macerans* Amylase

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Bacillus macerans contains an amylolytic enzyme which is secreted into the culture medium. This enzyme is different from all the other amylases known to us; it converts starch, glycogen *etc.* into the non-reducing Schardingerdextrins (cyclo-amyloses) which can be determined semi-quantitatively by the Tilden-Hudson iodine test [1]. Since the action of the enzyme on starch paste is accompanied by an extremely rapid decrease in viscosity it must be concluded that the enzyme does not only split off end-chains from the amylopectin molecules (under the formation of cycloamyloses) but also ruptures linkages in interior chains between branching points [2]. The action is there-

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fore, in a way, similar to that of the ordinary α-amylases, but in the case of *macerans* amylase there is, in addition to the hydrolysis, a formation of new 1,4-α-glucosidic bonds, a reaction which probably can be described as a »transglucosidation». Since the interior chains of the amylopectin are relatively short no formation of cycloamyloses from these parts of the molecules can take place. Therefore, the rapid fall in viscosity should be accompanied by an increase in reducing groups. The experiments are in agreement with this view.

The amylolysis by *macerans* amylase does not cease, however, at the stage of the Schardinger dextrins. In some cases at least, the cyclo-amyloses gradually disappear again. Myrbäck and Gjörling [2] found that, on a very extended action of the *macerans* enzyme, the dextrins disappeared completely under the formation of maltose exclusively. Kneen and Beckord [3] also state that components of the *macerans* amylase system cause hydrolysis of the cyclo-amyloses to fermentable sugar. As we have found in new experiments, these observations are probably related to a reversibility of the *macerans* enzyme action. French, Pazur, Levine and Norberg [4] have shown that in solutions of the *macerans* enzyme, cyclo-amyloses and maltose (or certain other sugars) an increase in optical rotation occurs which is explained as due to the formation of higher open-chain saccharides through a reversion of the recognized action of the enzyme: the formation of the cyclo-amyloses from non-cyclic chain molecules. Small amounts of a fraction, probably containing a mixture of such saccharides were recovered.

We have been able to verify the statements concerning the increase in optical rotation. If the explanation given is correct it must be concluded that the open-chain saccharides, which are supposed to be formed, should contain 1,4-α-glucosidic linkages exclusively. If so, they should be broken down to maltose (and possibly small amounts of maltotriose from chains with an uneven number of glucose residues) by β-amylase. In the following experiments we used a solution of the *macerans* enzyme containing one unit per ml. The β-amylase solution had a very high activity: 1 ml in 100 ml 1 % starch solution gave 50 % conversion in about 2 hours. The following mixtures were prepared and stored under toluene at 20°. Pure Schardinger α-dextrin was used.

1)	1 g dextrin,	0.4 g maltose,	5 ml *macerans* enzyme,	5 ml β-amylase
2)	1 g »	0.4 g »	5 ml » »	5 ml water
3)	1 g »	0.4 g »	5 ml water,	5 ml β-amylase

After different incubation times the fermentable sugar was determined with baker's yeast (after removal of toluene). No reaction, or at the utmost a very slight one, took place in exp. 2 and 3. In experiment 1, however, the amount of fermentable sugar increased: after 24 hours 0.69 g maltose was found and after 6 days 1.08 g. The experiments suggest that the »hydrolysis of the Schardinger dextrins» to fermentable sugar is due to a joint action of *macerans* amylase and β-amylase (or probably any other ordinary amylase), and may well be explained on basis of the assumed reversibility of the *macerans* amylase action.

It should be emplasized that, in our experiments, the increase in optical rotation and the hydrolysis were both very slow. Since β-amylase was added in a great excess it must be concluded that the equilibrium between the cyclo-amy-